TECHNOLOGY DEPT.

April 16, 1941

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DETROIT

NATIONAL PETROLEUM NEWS

MOTOR OIL OXIDATION PREDICTABLE BY NEW TEST, CHEMISTS ARE TOLD

A modification of the Indiana oxidation test incorporating a new stirring technique enables closer correlation of laboratory test results with road performance of motor oils, A.C.S. Petroleum Division is told in symposium on analytical methods.

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• • •

SPEEDS VISCOSITY MEASUREMENT IN CAPILLARY TYPE VISCOMETER

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Synthetic Rubbers Rely on Petroleum

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NEWS IN BRIEF

Coal may develop as oil source, says Bureau of Mines in reporting hydrogenation experiments. Page 6.

* * *

Louisiana joins Interstate Oil Compact; Cole Committee Visits Gulf Coast. Page 5.

* * *

ICC orders rail rates cut from Mid-Continent to Mid-West. Page 5.

* * *

Canada gasoline price-fixing seen if limited to two grades. Page 5.

* * *

If war comes, Army will get fuel supplies from local sources. Page 6.

Union Pipe Line Co. seeks right to construct pipeline across Pennsylvania. Page 15.

* * *

Increase of $1,000,000 in Anti-trust division appropriations being viewed by Senate. Page 7.

* * *

Proration opponents prepare for "conservation battle" in Illinois. Page 16.

* * *

Repeal of Miller-Tydings Act opposed by NAPR executive committee. Page 13.

* * *

Mid-West marketer held subject to Wage-Hour Act. Page 10.

REFINING TECHNOLOGY EDITION

ERIE's NEW PRODUCT

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Service Transmissions and Differentials the modern way

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ERIE

25 lb. Kit illustrated . . . Same design top with pumping unit and 4-caster dolly available for standard 100 lb. drums.

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COMING MEETINGS

APRIL

Greater New York Safety Council, Safety Convention & Exposition, Hotel Pennsylvania, N. Y., Tues.-Fri., April 22-25.

Petroleum Industry Electrical Assn., Tulsa, Okla., Wed.-Fri., April 23-25.

Natural Gasoline Assn. of America, Annual Convention, Baker Hotel, Dallas, Texas, Wed.-Fri., April 23-25.

Fuel Oil Distributors Assn., Asbury Park, N. J., Wed.-Fri., April 24-25.

National Petroleum Assn., semi-annual Meeting, Hotel Cleveland, Cleveland, O., Thurs.-Fri., April 24-25.

Petroleum and Natural Gas Conference, State College, Pa., Fri.-Sat., Apr. 25-26.

MAY

Pennsylvania Natural Gas Assn., The Bradford District Pennsylvania Oil Producers Assn., Pennsylvania Grade Crude Oil Assn. with 10th Pennsylvania Mineral Industries Conference, Nittany Lion Inn, State College, Pa., Fri.-Sat., May 2-3.

American Trucking Assn., Inc., 2nd Annual Spring Forum, Continental Hotel, Kansas City, Mo., Sun.-Wed., May 4-7.

American Gas Assn., Natural Gas Section, Dallas, Tex., Mon.-Thurs., May 5-8.

Independent Oil Men's Assn. of New England, Annual Convention, Copley Plaza Hotel, Boston, Mass., Thurs., May 8.

Society of Automotive Engineers, Production Meeting, Schroeder Hotel, Milwaukee, Wis., May 12 and 13.

Virginia Petroleum Jobbers Assn., Spring Meeting, John Marshall Hotel, Richmond, Va., May 15.

Virginia Oil Men's Assn., annual spring meeting, John Marshall Hotel, Richmond, Va., Fri., May 16.

American Institute of Chemical Engineers, 33rd Semi-Annual Meeting, Edgewater Beach Hotel, Chicago, Ill., Mon.-Wed., May 19-21.

American Petroleum Institute, 11th Mid-Year Meeting, Mayo Hotel, Tulsa, Okla., Mon.-Fri., May 19-22.

National Assn. of Purchasing Agents, (Oil Company Buyers' Group) Stevens Hotel, Chicago, Mon.-Thurs., May 26-29.

National Oil Scouts & Land Men's Assn., Dallas, Tex., Thurs.-Sat., May 29-31.

JUNE

Society of Automotive Engineers, Summer Meeting, The Greenbrier, White Sulphur Springs, W. Va., Sun-Fri., June 1-6.

Illinois-Indiana Petroleum Assn., 9th Annual Petroleum Conference, Robinson, Ill., Sat., June 7.

American Society of Mechanical Engineers, Petroleum Division, Kansas City, Mo., Mon.-Fri., June 16-20.

Pennsylvania Grade Crude Oil Assn., Annual Meeting, Bradford, Pa., Thurs.-Fri., June 19-20.

Kentucky Oil & Gas Assn., Mid-Year Meeting, Lexington, Ky., Fri.-Sat., June 20-21.

American Society for Testing Materials, 44th Annual Meeting, Palmer House, Chicago, Ill., Mon.-Fri., June 23-27.

AUGUST

National Assn. of Petroleum Retailers, 9th Annual Convention, La Salle Hotel, Chicago, Ill., Tues.-Thurs., Aug. 19-21.

SEPTEMBER

American Chemical Society, Atlantic City, N. J., Mon.-Fri., Sept. 8-12.

National Petroleum Assn., Hotel Traymore, Atlantic City, N. J., Wed.-Fri., Sept. 17-19.

Society of Automotive Engineers, National Tractor Meeting, Schroeder Hotel, Milwaukee, Wis., Thurs.-Fri., Sept. 25-26.

National Lubricating Grease Institute, 9th Annual Meeting, Stevens Hotel, Chicago, Ill., Mon.-Tues., Sept. 29-30.

OCTOBER

Texas Mid-Continent Oil & Gas Assn., Beaumont, Tex., Tues.-Thurs., Oct. 9-11.

American Institute of Mining & Metallurgical Engineers, Petroleum Division, Dallas, Tex., Thurs.-Sat., Oct. 16-18.

Society of Automotive Engineers, National Aircraft Production Meeting, Baltimore Hotel, Los Angeles, Calif., Thurs.-Sat., Oct. 30-Nov. 1.

California Natural Gasoline Assn., Los Angeles, Calif., Fri., Oct. 31.

NOVEMBER

American Petroleum Institute, 22nd Annual Meeting, San Francisco, Calif.; Mon.-Fri., Nov. 3-7.

NATIONAL PETROLEUM NEWS

APRIL 16, 1941

NEWS

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Chicago, 59 E. Van Buren Street, Telephone, Harrison 5901-2-3.

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THIS WEEK WITH NPN

TRAINING

Forward-looking Oil Marketers have recognized the increasing need and importance of trained personnel. That is why many training schools and stations have been inaugurated by these companies. And now comes word from Indiana University that in co-operation with the Indiana Independent Petroleum Association, it is preparing a course of study for service station operators and petroleum marketers. The university asks for copies of NPN to be included in the bibliography and other source material for the 20 instructors of these courses.

WHEEL BEARING

In our March 19th issue, we published an article on servicing wheel bearings as a profitable lubrication service. One large marketing company writes, "Your article is valued so highly here that we would like to distribute reprints to our dealers." They conclude by asking for quotations on 5000 reprints. And another company says, "We want to compliment you on this excellent article" and ask for copies for distribution to sales employes.

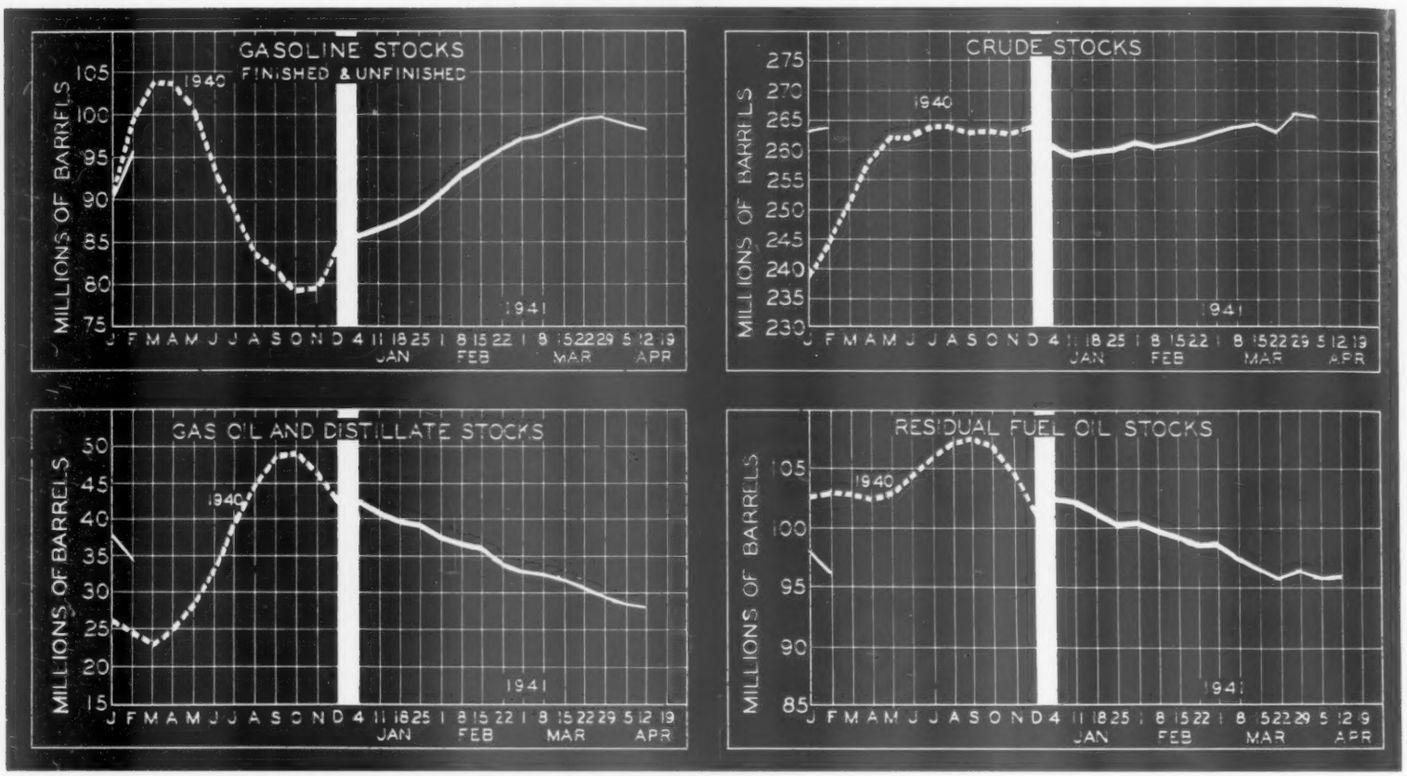
OIL PRICE HANDBOOKS

That the price information contained in the 17 editions of our OIL PRICE HANDBOOK is valued by Oil Marketers is evidenced by a rush order from an eastern company asking for 13 books starting with the 1925 edition, plus 7 copies of the 1940 edition, to complete files in various departments. The 1940 edition is the largest and most complete edition we have published and carries daily prices of petroleum products for 1940. Copies are still available at $12.50 per copy.

OIL AND DEFENSE

Current issues of NPN carry news items featuring the Oil Industry's preparedness in meeting every demand of the Defense Program. And NPN's thorough coverage of this subject prompted one reader to write to us for help. He states, "I have been asked to make a ten-minute speech on the subject, 'The Oil Industry's Role in National Defense,'" and concludes his letter with a request for specific articles published in NPN to use as reference.

•STATISTICS•


GASOLINE STOCKS
FINISHED & UNFINISHED
MILLIONS OF BARRELS
1940
1941
CRUDE STOCKS
GAS OIL AND DISTILLATE STOCKS
RESIDUAL FUEL OIL STOCKS
J F M A M J J A S O N D 4 11 18 25 1 8 15 22 1 8 15 22 29 5 12 19 26
JAN
FEB
MAR
APR

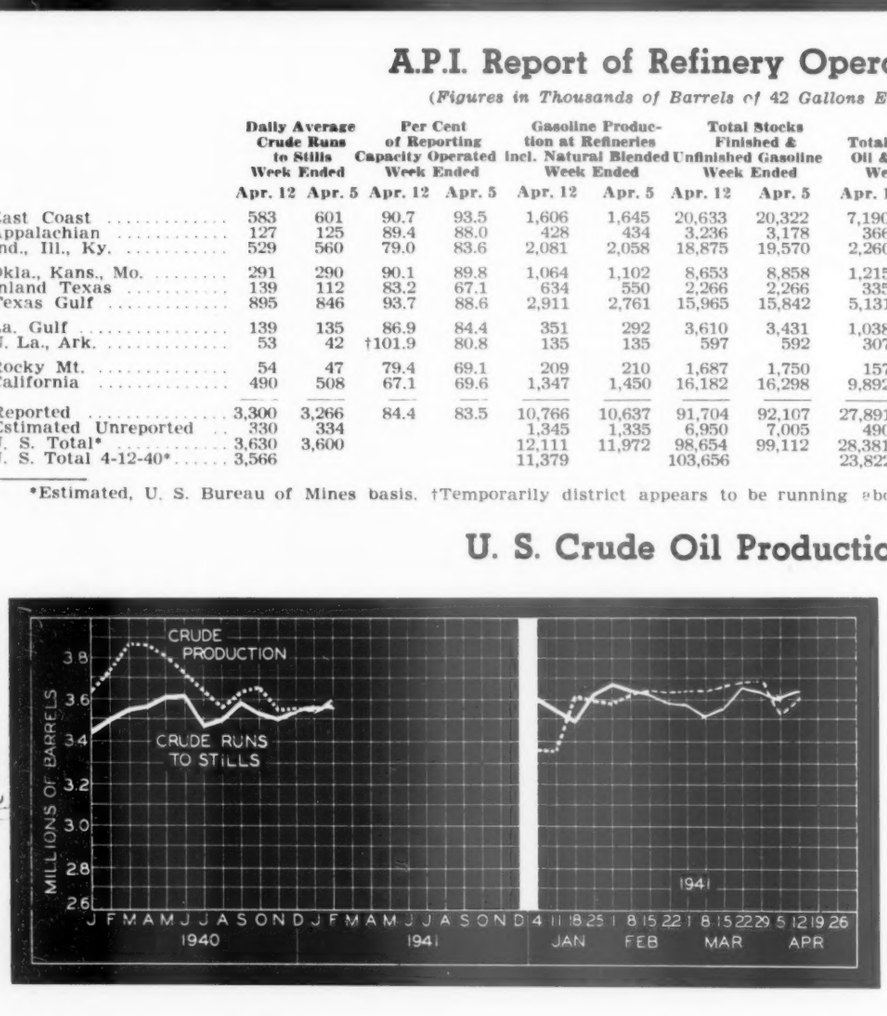
A.P.I. Report of Refinery Operations

(Figures in Thousands of Barrels of 42 Gallons Each)

	Daily Average Crude Runs to Stills Week Ended		Per Cent of Reporting Capacity Operated Week Ended		Gasoline Production at Refineries incl. Natural Blended Week Ended		Total Stocks Finished & Unfinished Gasoline Week Ended		Total Stocks Gas Oil & Distillates Week Ended		Total Stocks Residual Fuel Oil Week Ended		Stocks Aviation Gasoline Included in Finished & Unfinished Gasoline Total Week Ended	
	Apr. 12	Apr. 5	Apr. 12	Apr. 5	Apr. 12	Apr. 5	Apr. 12	Apr. 5	Apr. 12	Apr. 5	Apr. 12	Apr. 5	Apr. 12	Apr. 5
East Coast	583	601	90.7	93.5	1,606	1,645	20,633	20,322	7,190	7,425	8,897	7,984	**East Coast**	
Appalachian	127	125	89.4	88.0	428	434	3,236	3,178	366	394	432	432	619	558
Ind., Ill., Ky.	529	560	79.0	83.6	2,081	2,058	18,875	19,570	2,260	2,289	2,863	2,873		
Okla., Kans., Mo.	291	290	90.1	89.8	1,064	1,102	8,653	8,858	1,215	1,165	1,947	1,921	**Interior**	
Inland Texas	139	112	83.2	67.1	634	550	2,266	2,266	335	326	1,362	1,398	892	911
Texas Gulf	895	846	93.7	88.6	2,911	2,761	15,965	15,842	5,131	5,190	6,410	7,066		
La. Gulf	139	135	86.9	84.4	351	292	3,610	3,431	1,038	1,019	2,257	2,227	**Gulf Coast**	
N. La., Ark.	53	42	†101.9	80.8	135	135	597	592	307	311	592	569	3,350	3,319
Rocky Mt.	54	47	79.4	69.1	209	210	1,687	1,750	157	171	480	461	**California**	
California	490	508	67.1	69.6	1,347	1,450	16,182	16,298	9,892	10,044	68,591	68,785	1,585	1,489
Reported	3,300	3,266	84.4	83.5	10,766	10,637	91,704	92,107	27,891	28,334	93,831	93,726	6,446	6,277
Estimated Unreported	330	334			1,345	1,335	6,950	7,005	490	490	1,640	1,645	250	250
U. S. Total*	3,630	3,600			12,111	11,972	98,654	99,112	28,381	28,824	95,471	95,371	6,696	6,527
U. S. Total 4-12-40*	3,566				11,379		103,656		23,822		102,694		4,880	

*Estimated, U. S. Bureau of Mines basis. †Temporarily district appears to be running above rated capacity.

U. S. Crude Oil Production


CRUDE PRODUCTION
CRUDE RUNS TO STILLS
MILLIONS OF BARRELS
1941
J F M A M J J A S O N D J F M A M J J A S O N D 4 11 18 25 1 8 15 22 1 8 15 22 29 5 12 19 26
1940
1941
JAN
FEB
MAR
APR

(American Petroleum Institute figures)

	—WEEK ENDED— Apr. 12 Barrels (Daily Average)	Apr. 5 Barrels
Oklahoma	398,950	422,050
Kansas	206,950	209,850
Nebraska	4,300	4,300
Texas	1,282,150	1,202,200
Louisiana	303,200	305,900
Arkansas	71,600	71,300
Mississippi	21,400	17,250
Illinois	320,950	317,650
Indiana	22,000	19,000
Eastern (Ill. & Ind. excluded)	91,450	91,150
Michigan	36,900	37,100
Wyoming	78,800	75,450
Montana	19,500	19,000
Colorado	3,850	3,850
New Mexico	109,050	109,050
California	632,600	609,200
Total U. S.	3,603,650	3,514,300
Crude Imports	135,000	71,140
Total New Supply	3,738,650	3,585,440

•STATISTICS•

N.P.N. Gasoline Index

	Dealer T. W.	Tank Car
	Cents per Gallon	
April 14	9.21	5.54
Month ago	8.74	5.16
Year ago	9.52	5.88

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 9 wholesale markets for regular-grade gasoline.

Crude Oil Stocks

(U. S. Bureau of Mines figures)
Thousands of Barrels

Grade or Origin	Mar. 29	Apr. 5	Change from Mar. 29
Pennsylvania Grade	4,291	4,267	— 24
Other Appalachian	1,400	1,429	+ 29
Lima-Michigan	1,114	1,117	+ 3
Illinois-Indiana	21,807	21,843	+ 36
Arkansas	2,888	2,796	— 92
Kansas	8,961	8,843	—118
Louisiana:	12,897	12,754	—143
Northern	4,342	4,364	+ 22
Gulf Coast	8,555	8,390	—165
Mississippi	789	811	+ 22
New Mexico	7,222	7,215	— 7
Oklahoma	64,276	64,159	—117
Texas:	85,178	84,878	—300
East Texas	20,561	20,549	— 12
West Texas	15,953	15,811	—142
Gulf Texas	23,544	23,482	— 62
Other Texas	25,120	25,036	— 84
Rocky Mountain	15,575	15,577	+ 2
California	37,221	37,245	+ 24
Foreign	2,568	2,606	+ 38
Total U. S. refinable	266,187	265,540	—647
Heavy in California	11,963	11,936	— 27

Mid-Continent Lube Statistics February, 1941

(Compiled by Western Petroleum Refiners Ass'n. from reports of 12 member companies. Figures in barrels of 42 gallons.)

	Bright Stock	Viscous Neutrals	Paraffin Oils	Steam Refined Stock	Blended Oils
Production	176,296	182,513	66,729	25,033*	212,619
Shipments:					
Domestic	120,129	186,126	66,971	14,835*	147,151
Export	67,094	1,341	244	118*	39,935
Total	187,223	187,467	67,215	14,953*	187,086
Inventory,					
Feb. 28, '41	393,769	277,507	69,225	81,690*	193,138
Jan. 31, '41	404,696	282,461	69,711	71,610*	167,605
Feb. 29, '40	328,261	258,056	45,073	56,733*	122,337

*New basis of reporting began January, 1940.

G. C. R. A. Stocks Report

(Compiled by Gulf Coast Refiners Assn. from reports of member companies. Figures in barrels).

	Mar. 15	Mar. 31
Gasoline Stocks, Total (Includes Aviation, Motor fuel & Naphtha)	2,109,653	2,216,693
Aviation Gasoline	513,586	532,160
Motor Fuel	1,543,906	1,623,268
Naphtha	52,161	61,265
Kerosine	291,467	278,143
Diesel Gas Oil	547,274	581,972
Diesel Fuel	(a)	47,301
Gas Oils, other types	552,256	492,366
No. 5 Fuel Oil	164,275	154,709
Bunker "C" Fuel Oil	304,778	345,170
Crude Runs (daily average)	60,878	62,641

(a) Not reported.

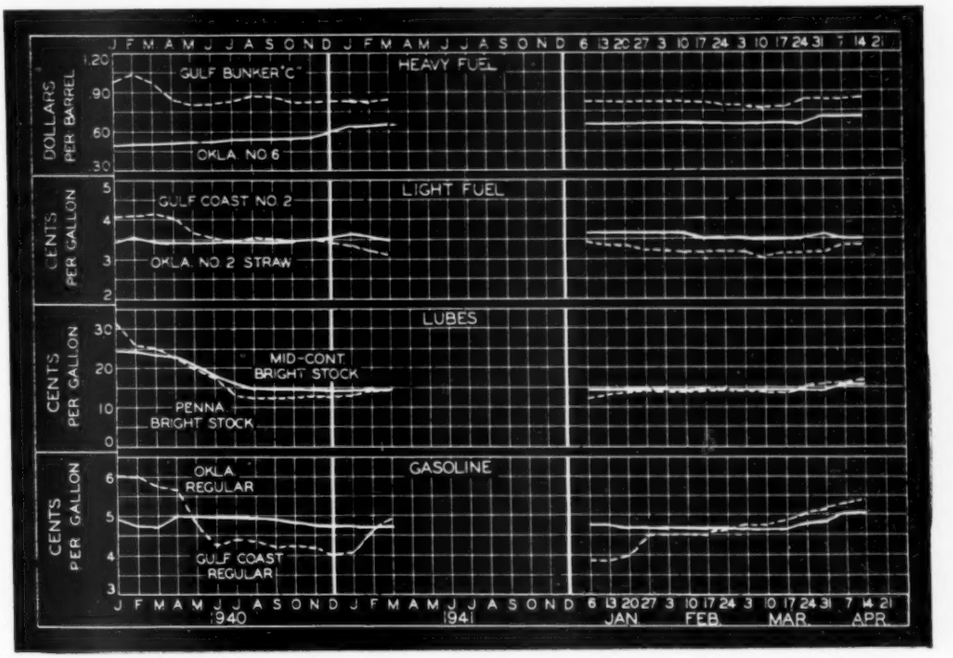
AUTOMOBILES—U. S. Factory Sales & Canadian Production

(Number of Vehicles, including Chassis. Compiled by U. S. Census Bureau)

	Feb. 1941	Jan. 1941	Feb. 1940
UNITED STATES			
Passenger Cars—			
Domestic Market	385,676	401,799	324,555
Foreign Markets	8,807	9,459	13,201
Total	394,483	411,258	337,756
Commercial Cars, Trucks, & Road Tractors—			
Domestic Market	78,580	77,682	53,960
Foreign Markets	12,460	11,991	12,316
Total	91,040	89,673	66,276
CANADA			
Passenger Cars	10,647	11,990	12,779
Commercial Cars & Trucks	13,063	11,205	5,414
Total	23,810	23,195	18,193

REFINERY PRICES

(Monthly prices in graphs are averages of daily high and low prices shown in Platt's Oilgram. Weekly prices are averages of high and low prices shown in Monday Oilgram, and in National Petroleum News.)


J F M A M J J A S O N D J F M A M J J A S O N D 6 13 20 27 3 10 17 24 3 10 17 24 31 7 14 21
DOLLARS PER BARREL
GULF BUNKER "C"
HEAVY FUEL
OKLA. NO. 6
CENTS PER GALLON
GULF COAST NO. 2
LIGHT FUEL
OKLA. NO. 2 STRAW
LUBES
MID-CONT. BRIGHT STOCK
PENNA. BRIGHT STOCK
GASOLINE
OKLA. REGULAR
GULF COAST REGULAR
1940
1941
JAN.
FEB.
MAR.
APR.

Petroleum Supply & Demand, February 1941

(U. S. Bureau of Mines figures, thousands of barrels)

	Feb., 1941	Jan., 1941	Feb., 1940	January-February 1941	January-February 1940
NEW SUPPLY:					
Domestic production:					
Crude petroleum	100,791	110,647	108,668	211,438	221,808
Daily average	3,600	3,569	3,747	3,584	3,697
Natural gasoline	4,565	4,884	4,179	9,449	8,450
Benzol[1]	280	313	231	593	503
Total production	105,636	115,844	113,078	221,480	230,761
Daily average	3,773	3,737	3,899	3,754	3,846
Imports:[2]					
Crude petroleum for domestic use	3,297	2,712	2,343	6,009	4,007
Crude petroleum in bond	74	81		155	286
Refined products for domestic use	[3]2,525	2,410	2,731	4,935	4,052
Refined products in bond	[4]1,620	882	1,553	2,502	2,994
Total new supply, all oils	113,152	121,929	119,705	235,081	242,100
Daily average	4,041	3,933	4,128	3,984	4,035
Increase in stocks, all oils	392	[5]4,823	12,600	[5]4,431	8,276
DEMAND:					
Total demand	112,760	126,752	107,105	239,512	233,824
Daily average	4,027	4,089	3,693	4,060	3,897
Exports:[2]					
Crude petroleum	1,342	1,687	3,327	3,029	7,529
Refined products	[6]4,190	5,531	5,765	9,721	12,491
Domestic demand:					
Motor fuel	42,253	45,344	37,557	87,597	77,927
Kerosine	6,484	7,769	6,263	14,253	13,905
Distillate fuel oil	17,720	20,998	17,623	38,718	40,085
Residual fuel oil	30,917	33,338	27,123	64,255	59,596
Lubricating oil	1,798	2,367	1,522	4,165	3,576
Wax	110	135	61	245	186
Coke	593	977	629	1,570	1,318
Asphalt	1,275	1,136	788	2,411	1,609
Road oil	64	125	68	189	200
Still gas	4,960	5,349	5,392	10,309	10,914
Miscellaneous	232	242	35	474	275
Losses	822	1,754	952	2,576	4,213
Total domestic demand	107,228	119,534	98,013	226,762	213,804
Daily average	3,830	3,856	3,380	3,843	3,563
STOCKS:					
Crude petroleum:					
Refinable in U. S.	264,432	263,251	244,417	264,432	244,417
Heavy in Calif.	11,886	11,839	13,408	11,886	13,408
Natural gasoline	5,311	5,490	4,757	5,311	4,757
Refined products	277,894	278,551	270,464	277,894	270,464
Total, all oils	559,523	559,131	533,046	559,523	533,046
Days' supply	139	137	144	138	137

[1] From Coal Economics Division. [2] Imports of crude as reported to Bureau of Mines; all other imports and exports from B.F.D.C. [3] Exclusive of 43,000 barrels imported into non-contiguous territories. [4] Exclusive of 121,000 barrels imported into noncontiguous territories. [5] Decrease. [6] Exclusive of 11,000 barrels exported from non-contiguous territories but inclusive of 623,000 barrels shipped from U. S. to territories and inclusive of 115,000 barrels withdrawn from bond for export.

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Named To Direct Asphalt Institute

Elected first full-time president of the Asphalt Institute this month, Herbert Spencer, Standard Oil Co. of New Jersey, brings to the Institute a background of widespread experience. One of its founders, he is recognized for his extensive work in standardizing most of the asphalt grades now used for highway purposes in the eastern part of the U. S.

Mr. Spencer graduated from the Rensselaer Polytechnic Institute, and was Resident Engineer for the New York State Highway Department before joining Standard Oil Co. of New Jersey in the capacity of road engineer. He has traveled extensively, and in connection with standardization of asphalt grades, has worked with committees from the various state highway departments and the Federal Bureau of Public Roads.

A resident of Montclair, N. J., Mr. Spencer is married and has 2 children, both girls. He is a member of the American Society for Testing Materials, the American Road Builders' Assn., the Association of Asphalt Paving Technologists and the Engineers' Club of New York.

Herbert Spencer

W. R. Macatee

Timed with the election of Herbert Spencer as president came the announcement that W. R. Macatee, who has been with the Asphalt Institute since his appointment in 1935 to take charge of a newly created field office in Cincinnati, Ohio, had been elected Managing Director.

Prior to joining the Institute, Mr. Macatee was in the asphalt sales department of The Texas Co., in charge of the Richmond, Va., office, and then with the Portland Cement Assn. In 1939, when the Asphalt Institute opened its offices in Washington, D. C., Mr. Macatee was placed in charge. He was named Assistant Managing Director in February, this year.

Mr. Macatee was born in Front Royal, Va., in 1886, and saw war service with the U. S. Marine Corps in Haiti, Santo Domingo and France. He lives in New York City, but continues in direct charge of the Institute's Washington office.

NATIONAL PETROLEUM NEWS

VOLUME 33 WEDNESDAY, APRIL 16, 1941 NUMBER 16

U. S. Demand For Gasoline Increases 17%

N. P. N. News Bureau

WASHINGTON, April 11.—Domestic demand for motor fuel continued to exceed expectations in February and amounted to an estimated 42,253,000 bbls., a daily average increase of 17% over February last year. Bureau of Mines reported today, adding all factors were favorable during month for heavy shipments.

Stocks of finished and unfinished gasoline rose to 95,646,000 bbls. on February 28, Bureau said, and although representing gain of about 5,300,000 bbls. for the month, stocks were left in much better shape than a year ago, particularly on a day's supply basis.

Domestic demand for distillate fuel oil in February of 17,720,000 bbls. was slightly higher (up 97,000 bbls.) than last year, as the influence of more burners in operation and larger demand for gas oil and diesel oil for in-

(*Continued on page* 17)

'Gas' Price-Fixing Weighed in Canada

Special to N. P. N.

TORONTO, April 12. — Restriction of gasoline sold in Canada to two grades, a move which is well under way and expected to be put into effect early in June, will "lay the foundation for the fixing of gasoline prices if such should become necessary," Canadian Oil Controller George R. Cottrelle said this week in announcing that the standardization is being initiated by his office.

The move to force sales of only a "premium" gasoline of 75 to 78 octane, and a "regular" gasoline of 66 to 70 oct., will be carried out by each of the 9 provinces, all of which have enabling legislation on their statute books, needing only orders in council to bring the change into effect. Such an order in council has already been passed in the province of Alberta, but has not been made effective. Alberta is reported as waiting on the adjoining provinces of British Columbia and Saskatchewan to put similar measures into force simultaneously.

One of the purposes of the

(*Continued on page* 7)

Pump Suit Postponed

WASHINGTON, April 15.—Justice Department reports Federal Judge Walter C. Lindley as having indefinitely postponed arraignment of defendants in Chicago gasoline pump antitrust case pending submission of briefs due April 30 from defendants filing demurrers to indictments.

Defendants are given as Tokheim Pump Co., Gilbert and Barker Manufacturing Co., S. C. Hope, Wayne Pump Co., and B. F. Geyer. Government has been given until May 30 to reply to defendants' briefs.

Cole Oil Group Sees Louisiana Enter Compact

Special to N. P. N.

NEW ORLEANS, April 15.—Congressional oil investigating committee was touring Louisiana Gulf Coast fields today, following its attendance yesterday at Interstate Oil Compact Commission's meeting here. Committee, headed by Congressman Cole, Md., chairman, is gathering final data for its report on the "need" for federal oil legislation.

Chairman Cole, before leaving here, said in an interview that the "great petroleum industry is rendering first-class service to the country in the present emergency." He expressed confidence that the industry could meet any and all demands that might be made upon it, in event of war.

Because Cole committee's hearings have not been printed yet, the chairman believes that it will be necessary to ask for an extension of the May 1 deadline for filing report. Recently the President asked the group to see what should be done about the stalemate which has resulted from railroads opposing construction of gasoline pipelines in the Southeast.

Committee is prepared to report on the pipeline question, said Mr. Cole, but he would give no inkling as to whether or not the committee agreed with the national defense commission that this pipeline project was a vital defense need.

(*Continued on page* 8)

Rails Cut Oil Rates From Mid-Continent

TULSA, April 15.—Two subjects of discussion, one pertaining to action by rails in compliance with the Interstate Commerce Commission's decision in Petroleum Rail Shippers' Assn. case (Docket 28106) and the other a proposed average reduction of about 1c a gal. in single carload rail rates on gasoline shipped from the Southwest to the Mid-West and North, are to be considered April 22 at St. Louis by officials of Southwestern and Western Trunk Line territory railroads.

Rails have already announced they will, on or before June 11, inaugurate "maximum" petroleum rail rates prescribed by the Interstate Commerce Commission in its decision in ICC Docket 28106 which represent reductions of 0.2c to 1.05c a gal. on gasoline.

But as pointed out by the rails, these "maximum" rates prescribed by the ICC will probably not permit rails to retain the business they now handle or permit them to regain any additional business in competition with pipelines. So with this in mind, and at the request of the carriers themselves, Southwestern Freight Bureau proposal 24106 and Western Trunk Line Committee Application 37-562 have been docketed and are up for public hearing April 22.

Ask 0.8 to 1.5c Reductions

The two proposals call for reductions of from 0.8c a gal. on gasoline to most Iowa destinations upward to as much as 1.5c a gal. to points in the upper Michigan peninsula, it was indicated. As now docketed, the proposal applies only to gasoline, natural gasoline and kerosine shipped by rail in single carload lots, but consideration will be given at the meeting as to whether or not proposed "gasoline rates" should be established as maxima on other petroleum products subject to competition by other means of transportation.

Rail rates proposed in the two dockets are 85% of the "maximum" rates prescribed in the

(*Continued on page* 14)

Chicago Fuel Oil 'Top' Prices May Be Higher for Next Year

N. P. N. News Bureau

CHICAGO, April 12.—"Top" prices in fuel oil contracts for the 1941-42 season were occupying the attention of oil companies and marketers in the Mid-West this week. Generally, these contracts are offered to fuel oil buyers on April 15, but indications here were that some companies would hold them up until later in the month.

From reports in the trade, however, indications were that maximum price in contracts to domestic users of light heating oils would be the same as last year—0.5c above current tank wagon price in Chicago, and 0.5c above "normal" prices in outlying markets.

"Tops" in contracts to supply tank wagon deliveries of industrial grades of fuel oil were causing most concern. Tank wagon price for Bunker C has ranged between 3.75 and 4.25c recently, with demand for this grade of oil reported exceptionally good with industrial activity, spurred by defense orders, nearing capacity in the Chicago area.

'Uncertain' on Heavy Fuel

On the eve of the time for signing contracts, suppliers generally said they were still uncertain as to what they might do on industrial fuels. Several said that there was a possibility that they would not place "top" prices in their contracts to supply Bunker C fuel. Others believed that the practice of last year, when "top" for Bunker C in Chicago was 0.75c above the tank wagon price at time of contract signing would prevail. Reports of the possibility of increasing the top to 1c above the current tank wagon price also were heard.

Tank wagon prices for domestic heating oil for the two main brackets in Chicago on April 15 of last year were 6.50c per gal. in deliveries of 400 gals. or more, and 7c for deliveries of 150 to 399 gallons. "Tops" in contracts with domestic users

for these brackets were 7c, and 7.50c, respectively. On Oct. 2, 1940, the tank wagon price advanced to 6.75 and 7.25c for light fuel, and these prices are still in effect.

If, as indicated by marketers, the "tops" in the 1941-42 contracts are placed at 0.5c above these prices, the tops will then be 7.25 and 7.75c, or 0.25 above those of last season.

At contract signing time in April of last year, the tank wagon price for Bunker C in lots of 1000 gals. or more was 3.25c, while deliveries of less than 1000 gals. were 1c per gal. higher. "Tops" in contracts for this grade were 4c and 5c, respectively.

May Be Higher

However, prices for Bunker C fuel have moved up during the year, with the general posted price at 3.75c—only 0.25c below the contract "top", and with some sellers asking up to 4.25c for this grade. If sellers use the same basis for contract "tops" in the season coming as for the 1940-41 season, the tops, based on prevailing tank wagon prices, will be 4.50 and 5.50c or 0.5c above those of last year.

PRICES

Illinois Crude

N. P. N. News Bureau

CLEVELAND, April 9.—Advances of 2c to $1.22 per bbl. in their postings for Illinois Basin crude, effective April 10, have been announced by Sohio Corp. (S. O. Ohio subsidiary) and Magnolia Petroleum Co.

Michigan Gasoline

CHICAGO, April 14.—Standard Oil Co. of Indiana today issued following announcement:

"Effective Thursday morning, April 17, throughout lower peninsula of Michigan, Standard Oil Co. will advance all subnormal tank wagon prices to both dealers and consumers on all 3 grades of motor gasoline 0.5c per gal., or to normal where the subnormalcy is less than 0.5c per gal."

New Jersey Gasoline

NEW YORK, April 12. — Standard Oil Co. of New Jersey has announced that effective April 10 its tank car price for "Esso" gasoline in the State of New Jersey was advanced 0.3c per gal., its dealer tank wagon price 0.2c, and its Fair Trade minimum retail price 0.5c per gal. The net price charged to dealers, however, was advanced 0.3c, company stated.

Effective April 11, the dealer tank wagon price for "Esso" kerosine was advanced 0.2c per gal. state-wide, according to the same announcement.

Standard of Indiana Advances Fuel Oil

N. P. N. News Bureau

CHICAGO, April 15.—Effective April 18, Standard Oil Co. (Indiana) is revising its quantity fuel oil prices in Chicago, the company announced today. On April 15, it advanced its tank wagon price for Bunker C fuel oil 0.25c for 1000-gal. deliveries, and added another price bracket for deliveries of this oil under 1000 gals.

After April 18, the Indiana Company will have 4 quantity brackets for No. 1 Furnace Oil, its grade "A" and "B" fuels. Presently, the company posts 3 quantity brackets for these oils. Change will not affect prices of the large quantity deliveries of all grades, it was said. On No. 1 and Furnace Oil, the company now posts 7.25c for deliveries of between 100 and 399 gals., but after April 18, deliveries of 100 to 150 gals. will be 7.50c, with dumps of 150 to 399 still at 7.25c.

Following are new Chicago schedules effective April 18:

	Stanolex No. 1	Stanolex Furnace Oil
1-99 gals.	8.5c	8.5c
100 to 149 gals.	7.5c	7.5c
150 to 399 gals.	7.25c	7.25c
400 gals. and over	6.75c	6.75c

	Stanolex Fuel "A"	Stanolex Fuel "B"
1-99 gals.	7.5c	7.5c
100 to 399 gals.	6.5c	6.5c
400 to 749 gals.	5.5c	5.5c
750 gals. and over	4.75c	4.75c

Effective April 15:

	Stanolex Bunker "C"
1 to 399 gals.	6c
400 to 999 gals.	5c
1000 gals. and over	4c

No change was made by Standard in prices or quantity brackets for its "Stanolex" heater oil in Chicago.

If War Comes, Army Plans To Fuel At Local Sources

N. P. N. News Bureau

WASHINGTON, April 14. — Every bulk plant, gasoline pipeline, tank car, tank truck, barge and tanker in the U. S. is now regarded by the War Department as an essential source of gasoline supply for the Army if war comes to this country.

In planning against possibility of having to defend the nation against invasion, War Department is thinking in terms of an army dependent for its motor fuel on local facilities already provided for civilian requirements by private industry. No gasoline other than the usual supply for 2½ days is to be transported from place to place with the troops, except the so-called "rolling reserve" in 750-gal. tank trucks, for emergency use only.

Shelve 1917 Plans

War Department plans for protecting the U. S. against invasion recognize that maintenance of an adequate gasoline supply is a major problem confronting the modern, highly-motorized Army. Quartermaster Corps in preparing its 1941 motor fuel supply plans, has abandoned 1917 idea of permanent Army gasoline depots in favor of a system of "living off the country," which means that gasoline will be secured from the nearest local source, whether it be from nearby bulk plants, tank cars, tank trucks, gasoline pipelines, barges or tankers.

Of these, railroad tank cars are considered most important source. Gasoline pipelines, tank trucks, barges and tankers would serve as secondary sources, while gasoline available at local bulk plants would provide temporary supply.

Army, meanwhile, is planning to rely on local sources for gasoline used in peacetime maneuvers in same manner as it has in the past. Storage is now being installed at each Army post in sufficient capacity to fill the tank of every vehicle twice, but this is intended solely for operating needs of motorized equipment while at the post.

Complex Supply Problem

Heavy hourly consumption of gasoline by a fast-moving, motorized army indicates the need for a quickly available supply at many different points in any 24-hour period. The United States Army, for example, now numbers something more than 1,000,000 men, and if this force were required to go into combat action, it would need an estimated maximum gasoline supply of 2,000,000 gals. an hour for its 75,000 tanks, trucks, motorcycles, passenger cars and other vehicles.

Each of the 4 armored divisions would need 9660 gals. of gasoline an hour, and the 18 National Guard Infantry divisions would require 6452 gals. each. Hourly gasoline consumption of each of the 9 Regular Army Infantry divisions would come to 3410 gals., while one completely motorized Regular Army Infantry division would use 6881 gals. an hour, and the horse Cavalry division, 3412 gals.

Army consuming motor fuel in such quantities means Quartermaster Corps must be prepared to move gasoline to the front in a volume which would have been considered fantastic during the first world war. Quantity of gasoline needed to keep a modern, motorized army in action is only part of the supply problem, however, since in this age of "blitzkrieg" warfare, the scene of conflict may shift 50 to 100 miles in a single day. Record so far is the 260-mile jump made by a British armored division in Africa.

Study Portable Pipeline

Among ideas being developed by Quartermaster Corps to facilitate movement of motor fuel

Coal Seen As Auxiliary Source of Oil In Bureau of Mines Hydrogenation Test

WASHINGTON, April 12. — Bureau of Mines predicted this week that coal may develop as an auxiliary source of gasoline and oil before nation's petroleum reserves are exhausted, in press release reporting progress of hydrogenation experiments at its Pittsburgh, Pa., laboratories.

Estimating coal reserves at some 3 trillion tons, Bureau declared hydrogenation process if applied to these reserves, would yield 3 trillion, 800 billion bbls. of oil—enough to last the country 3000 years at present rate of consumption.

Pittsburgh experiments were described in press release as definitely establishing hydrogenation process as feasible and, in certain circumstances, advisable, although cost of gasoline and oil produced from coal has not been estimated on a quantity production basis.

Bureau has now completed tests of 13 different coals, which have shown an oil yield ranging from 2 tons for each 3 tons of coal mined from Pittsburgh, Pa., Black Creek, Ala., and lower Sunnyside, Utah, beds, to 1 ton of oil for each 3 tons of coal mined from lignite beds to North Dakota.

Pointing out that German coal hydrogenation plants are operating under government subsidy, Bureau of Mines said purpose of its experiments is "to determine yields and quality of gasoline and oil obtainable from various American coals so that when the commercial need arises American industry will be in a position to select the most suitable coal and make rapid progress in establishing this new industry.

"Although the United States has large deposits of both petroleum and coal at present, there is little doubt that our petroleum reserves are much smaller and that at some future date, the 'hydrogenation of coal' to produce gasoline and bulk organic chemicals will be essential to our progress. When production costs permit, coal hydrogenation probably will serve as an auxiliary source of gasoline, diesel oil, tar acids, and solvents. It is not necessary to envision the exhausting of petroleum before coal hydrogenation can become economically feasible."

to combat forces is a 3-inch, portable steel pipeline, intended to eliminate jamming of roads leading to front with cargo trucks hauling gasoline. Such portable lines could secure gasoline from tank cars, permanent gasoline pipelines, bulk storage tanks, barges or tankers, and can be laid up to 20 miles along the surface of the ground, ready for use, as fast as the truck carrying the pipe moves forward.

Delivery of gasoline to fighting units will be made in 5 and 10-gal. cans transported in cargo trucks from sources of supply—portable and permanent gasoline pipelines, bulk plants, tankers, barges, tank cars and tank trucks. Government has bought hundreds of thousands of these 5 and 10-gal. cans.

Use 8 Gasoline Lines

For rapid filling of cans, Quartermaster Corps has perfected a power-driven, portable gasoline dispenser with 8 nozzles to fill that number of cans simultaneously. Dispenser, which can be attached to a permanent or a portable gasoline pipeline or other source of supply, is usually mounted on a semi-trailer, but can also be moved about in a cargo truck.

Quartermaster Corps has not forgotten that a division or regiment might become separated from the main force, and to keep such isolated troops supplied with motor fuel, has developed a system of delivery whereby cans of gasoline can be dropped by parachute from airplanes.

See Canada 'Gas' Price-Fixing If 2 Grades Are Standardized

(*Continued from page* 5)

change, which will not interfere with the sale of aviation gasoline, now available in 100, 91, 87 and 80 octane, is to conserve U. S. dollars for war purchases. This saving will come largely through economizing on tetraethyl lead. Imports of tetraethyl lead in 1939 amounted to over $3,000,000, and with increased aviation consumption in 1940, this figure would be considerably exceeded.

Announcement of the proposed standardization has caused considerable apprehension among oil and gasoline distributors. Many feel it will neutralize the value of the advertising they have been doing for years on their own special brands, and will work against the small distributor to the advantage of the large, as the public will conclude that all gasolines are the same within the framework of the 2 approved grades. Those depending for sales on price appeal will feel effect of the new regulations most severely, it was believed.

In addition to adopting standards for motor gasoline, tractor fuels are also expected to be standardized.

Warns On Gas Waste

CALGARY, April 14.—George R. Cottrelle, Oil Controller for Canada, in an interview during a trip here, warned that waste of natural gas in the Turner Valley oil field must be stopped in the interests of Canada's wartime economy. Gas required to lift crude oil in the Valley to the surface was being burned in the air and precious energy dissipated, he said.

Oklahoma Marketer Hits 'Gas' Pump 'Facts'

N. P. N. News Bureau

CLEVELAND, April 12. — "Mud Slinging From High Places" is the title of an article in the March number of The Oklahoma Oil Marketer, in which Miss Harriett Elliott, Defense Consumer member, is scored for issuing a statement misrepresenting the gasoline pump industry. (See NPN, Feb. 26, March 5, 1940). Says the Oklahoma publication:

"Editor Warren Platt of NPN called her hand by looking up the record and pointing out that the survey to which she referred was something like 25 years old. But she would not care about being fair enough to mention that in her mud-slinging bulletin.

"It seems in recent years that those who are given preferred opportunity to plaster somebody under a quasi-legal authority in some federal bureau, of which there are now an almost untold number, have the perverted idea that everybody who is in any kind of business which pays to the government, instead of being on a tax-eating job taking from the government, is dishonest, reprehensible, thieving, conniving, and altogether proper subject for persecution, prosecution, slander without recourse, and most every other abuse that can be heaped on."

Colored 'Gas' For Farms

CALGARY, April 14.—Purple gasoline for exclusive use of farmers has just been put on sale here, retailing at 13c per Imperial gallon including tax. Gasoline of this color must be used only as fuel for tractors and farm machinery.

Senate Committee Considers $1,000,000 Anti-Trust Bill

N. P. N. News Bureau

WASHINGTON, April 14. — House-approved Justice Department appropriations bill, increasing anti-trust division appropriation by $1,000,000 to a total of $2,325,000 for fiscal year starting next July 1, is now before Senate appropriations committee for subcommittee hearings.

Committee, in considering measure, has before it an American Farm Bureau Federation statement, urging that Justice Department push its anti-trust case against American Petroleum Institute, Ethyl Gasoline Corp., 22 major oil companies and their alleged affiliates. Suit, in Farm Bureau Federation statement, is pictured as holding promise to farmers of reduced gasoline prices—of as much as several cents per gallon, and its speedy prosecution as depending on addition of further personnel to anti-trust division staff.

Statement, which purports to list benefits farmer can expect to receive from anti-trust prosecutions in various industries, was presented on behalf of the Farm Bureau Federation by President Edward A. O'Neal when Justice appropriation bill was before House appropriations committee. O'Neal, who submitted statement in support of $1,000,000 increase in anti-trust division funds, recalled Farm Bureau Federation at its 1940 convention had passed resolution favoring more vigorous anti-trust law enforcement and larger appropriations to finance such a program.

'Gas and Oil' Included

Statement, which was read to House by Rep. Karl Stefan, Nebraska, during recent debate on Justice appropriation bill, includes "gas and oil" in a listing of industries where anti-trust investigations are said to appear necessary because of alleged price fixing, restraints, and collusive practices, which raise the price of commodities which farmers must buy. Statement previously had cited "petroleum" as one of several examples said to show how rigid prices reduce farm-purchasing power, and then went on to declare farmers' ability to buy petroleum was reduced by 30 per cent during 1929-1932 depression, and by 25 per cent during 1937-1938 recession.

Under heading of "gas and oil," O'Neal's statement says that:

"Within the last few years the Department of Justice has taken successful action against alleged conspiracies by petroleum manufacturers to eliminate the competition of independents by buying up the independent gasoline and to maintain the prices of gasoline by abusing patents which cover the use of tetraethyl lead. The Department has just begun a proceeding against the entire petroleum industry which charges that there is a conspiracy to restrict output, to fix prices and distributors' margins, to discriminate against independent producers, to charge excessive amounts for pipeline transportation, and to control wholesalers and retailers who distribute petroleum products.

"The over-all effect of this conspiracy is said to be to establish a high-cost system of distribution and to exact not only the return of these high-costs, but also the profits of a price-fixing conspiracy from every farmer who buys a gallon of gasoline or a quart of oil. The names of the defendants in this case take up 5 printed pages of the complaint. It is important to American farmers that the Department of Justice have a large enough staff to push this case rapidly to a conclusion and restore competition in the petroleum industry."

O'Neal statement, at a later point, has following to say on subject of "petroleum products":

Statement of O'Neal

"Gradually the anti-trust division is making headway against rigid prices of gasoline and oil. Breaks in the line of price control here and there have begun to benefit the farmer who buys important quantities of gasoline. In Washington for more than a year consumers have saved 2 cents a gallon on their gasoline bills due to what the dealers call 'a price war,' but which is in fact a step toward competition under the eye of the anti-trust division. This saving amounts to about $2,000,000 annually in the District of Columbia alone, and if extended generally over the country, would amount to hundreds of millions. A cent a gallon, for example, on a consumption of 25,000,000,000 gals., amounts to $250,000,000.

"There is reason to believe that the ultimate result of the broad petroleum suit now pending will break the petroleum blockade in such a manner that a saving of a cent per gallon is a modest figure. The breaking of the Middlewest pipeline control alone, in the heart of

the agricultural area, should save the farmer at least 2 cents a gallon on gasoline, to say nothing of the other phases of the suit.

"This 2 cent figure is not imaginary. It costs approximately 2 cents more per gallon to ship gasoline by tankcars than by pipeline. Yet delivered prices are fixed on the basis of tankcar rates, although petroleum products move from the Southwestern field to the Middle West by pipeline, either in the form of crude or refined products. The least we can expect of this suit is to pass this 2 cents on to the consumer in the agricultural areas." (O'Neal's statement, while not made public until nearly month later, was submitted to House appropriations committee on March 10—12 days before Interstate Commerce Commission announced decision in Petroleum Rail Shippers Association case prescribing lower freight rates from mid-continent to mid-western consuming points and new scale of gasoline pipeline tariffs for Great Lakes Pipeline and Phillips Petroleum Cos. See NPN, March 26).

Assistant Attorney General Thurman Arnold made no reference to oil, in his appearance before House appropriations committee to request additional $1,000,000, for a national defense anti-trust law enforcement program attacking "bottlenecks" hindering defense program, and restraints of trade increasing prices consumers and farmers must pay.

Latest word from Justice Department is to effect no immediate settlement is in prospect, in "big oil anti-trust suit," published reports to the contrary. Department is represented as preparing to push suit to trial.

Madison Case Retrial Continued to June 2

MADISON, Wis., April 14.—New trials scheduled here May 12 for 9 remaining defendants in the first Madison case (buying program) have been continued to June 2.

Those facing retrial on price fixing charges are: Standard Oil Co. of Indiana; Cities Service Oil Co.; Edward J. Bullock, vice-president, Indiana Standard; A. G. Maguire, chairman of board, Wadhams Oil Co.; Harry D. Fruehauff and H. E. Brandli, vice-presidents, Cities Service Export Oil Co.; O. J. Tuttle, tank car sales manager, Empire Oil and Refining Co.; Harry J. Kennedy, vice-president, Continental Oil Co.; and Alexander Fraser, president, Shell Petroleum Corp.

Louisiana Joins Oil Compact; Cole Group Visits Gulf Coast

(*Continued from page 5*)

National defense authorities have taken position that this pipeline would free many coastwise tankers now serving the Southeast from the Gulf. Southeastern railroads have insisted that they can take care of this movement of petroleum products and that there is no need for the new line.

Nor did the oil committee chairman give hint as to his group's attitude on federal oil legislation when he made a brief but cautious address at opening of the compact meeting here yesterday. As was to be expected from a Maryland democrat, Mr. Cole had kind words to say for States' Rights, especially in the matter of oil control. He pointed out that the Cole oil committee since its set up in 1934 had encouraged the idea of state conservation of petroleum resources and interstate co-operation, supporting the plan of an interstate compact from the start.

'Different' Views Told

Mr. Cole took occasion to comment on the "difference" in the attitude of oil men who, he said, vigorously opposed federal interference with the states in the matter of oil and gas conservation yet were asking the federal government to intervene and force the states to permit construction of gasoline pipelines in the Southeast.

The congressional oil group watched with keen interest as Governor Jones of Louisiana formally signed up for his state's participation in the Interstate Oil Compact for balance of its present term (unless extended by Congress the compact expires in September).

Jones Cites 'Clean Up'

Governor Jones told of conditions that existed in Louisiana's oil and gas regulatory affairs (several indictments resulted) and how matters had been cleaned up by his administration. The Louisiana governor said his state had an excellent conservation law now and that it was efficiently administered. He seemed to feel that Louisiana had nothing much to gain by joining the compact but that the Pelican State was willing to go along with its sister oil states in hopes that their joint efforts would aid all the states.

After touring the Louisiana Gulf coast fields, the Cole committee will go to Baton Rouge on Wedesday (April 16), call upon the governor and visit the refinery there. On April 17, the committee will visit the Mississippi oil fields, going over to El Dorado, Ark., on April 18 and returning to Shreveport late Saturday afternoon. On Sunday, the group expects to go to East Texas.

Louisiana Step 'Important' Says Governor Phillips

Special to N. P. N.

OKLAHOMA CITY, April 15. —"This was a very important meeting," said Oklahoma's Gov. Phillips today on his return from New Orleans where he was present when Louisiana officially joined Interstate Oil Compact Commission, Mr. Phillips is Compact chairman.

Louisiana's Gov. Sam Jones signed the pact making this state the ninth member. While Louisiana's action only applies to Sept. 1, it was felt that membership would be extended for 2 years, awaiting action in Congress.

Asked about Gov. Jones' statement that "other states will have to meet us in conservation practices," Gov. Phillips said, "we have no objection to that.

"We shall do everything possible to aid the industry and to have Congress renew the Compact. Louisiana's action means something to aid in stopping Federal control."

'Natural' Output Up

N. P. N. News Bureau

WASHINGTON, April 14. — Daily average production of natural gasoline for February was 6,848,000 gals., Bureau of Mines reported today. This is 231,000 gals. above the average for January, and 9% more than the average for February, 1940. Outstanding changes occurred in the Panhandle, Texas Gulf Districts and Louisiana.

Practicing Fuel Loading as War Maneuver

Gasoline field depot established during maneuvers at Ft. Benning, Ga. In actual warfare, power dispenser, here mounted on truck, would be filling cans from a tank car, bulk plant, pipeline or other local source. For story, see page 6.

THE EDITOR'S PAGE

Readers Comments and Opinions will be much Appreciated by—WARREN C. PLATT, Editor and Publisher, Penton Building, Cleveland, O.

War Boom's Increasing Demand Finds Oil Marketing at Highest Efficiency

The 17% nation wide increase in gasoline consumption in February over the same month last year is a fair indication of how people have gone back to work, bought cars, and gone riding. Most of this increase is probably to take people to and from work and relatively little for just pleasure.

Despite the government's big increases in purchases of motor fuel, these are but a part of the general increase. According to best estimates by the government itself, it never will be more than 20% of the country's total consumption.

Gasoline consumption seemed to start its climb in January. December of 1940 was a shade less than 5% above December of 1939. January of this year increased by 11% and now February jumps to 17% over last year. This 17% is greater than the increase in gasoline production from last year's low in March to its high in October, when production was up 11%.

It is hard to say that this rate of increase will continue throughout the year because of the great acceleration in construction of munitions works and in operation of many manufacturing plants during 1940. This acceleration was at an increasing rate especially during the last half of the year.

But any rate of increase above 6% or 7% will make a great deal of difference in volume of gasoline handled because of the tremendous amount consumed, almost 23,000,000,000 gals. last year. These billions of gallons consumed in 1940 represent a daily average increase of only 5.95% over 1939.

To move, store and handle this big increase in volume will call for much new equipment by oil marketing. If the extra increase over normal is figured at 10%, it means the handling of an additional 2,300,000,000 gals. This figures out at almost 300,000 tank car loads. In 3000 gal. trucks, this is 766,000 truck loads. If a truck dumps 2 such loads a day, it would take one truck more than 1000 years to haul all this extra increase. But as all this has to be hauled in one year, it means that 1000 trucks will be required, and they will have to be in addition to present equipment and in addition to the normal increase in last year's total truck equipment. And this is figuring the operations at a very high efficiency rate. All of this increase, of course, will not be handled by trucks, but it all will have to be handled by some type of equipment, and most of it by trucks.

This increase in demand is not uniform throughout the country. The surveys NPN is making of the effect of the construction of new munition centers and of the big increase in old manufacturing areas, shows that some companies are enjoying increases of several times this 17%. See the detailed story in this issue of NPN on the enormous development along the Virginia tidewater.

Fortunately for the oil industry, this war's boom finds its practices and equipment and methods of distribution well developed. The last war caught the industry and its equipment and its ideas of how best to do it, very much in its infancy. Oil marketing on the grand scale was brand new. We were only just out of the horse-drawn tank wagon period and were still dumping from small truck tanks with 5 gal. buckets. We had not learned the art of making our products flow continuously at a high rate of speed through relatively large lines and orifices and measured automatically and without interruption to the flow.

Today the marketing department of this oil industry has equipment and methods to use developed by 25 and 30 years of experience. An entirely new crop of engineers have come into being in that time and have brought new ideas. These will permit the oil industry to serve the public and the government in a far more efficient manner than in the last war.

Nor will there be any bottleneck in the industry's need to further equip itself to handle this big increase in volume of petroleum products. There is plenty of manufacturing capacity to make this modern equipment and, from all reports, sufficient original materials from which to make it.

All this extreme and efficient readiness is due to oil and its associated industries being up-to-date, free, and highly competitive businesses.

May they continue to serve the American people as free industries.

Only the Consumer Benefits

How persistently and consistently the price of gasoline has declined all these years is graphically pointed out by J. Howard Pew, president of the Sun Oil Co., in the company's annual statement for 1940. At the lowest point in the depression in 1933, the average price for gasoline was 12.41c per gallon, but for 1940 he says the average price for the industry's gasoline was 10.97c, the lowest in history.

Oil men have complained about declining prices and narrowing margins probably without realizing how steadily the price has dropped over the years. The drop has not been precipitated nor can it be said to be due in any way to the attacks of the government on the industry, Thurman Arnold's statement to the contrary notwithstanding. There has been consistent competition and consistent lowering of costs and those two factors go to make lower prices. Discussing this price situation President Pew of the Sun company, said:

"Once more we have to report that the price index figure for petroleum and its products, as stated by the Federal Bureau of Labor Statistics, is by long odds the lowest among the ten groups of commodities covered by the Bureau of Statistics. Taking the year 1926 as 100, the figure for petroleum and its products in November, 1940, was 49.3, while the figure for 'all commodities' was 79.6. From November, 1939, to November, 1940, the 'petroleum and products' index figure fell from 53.9 to 49.3. No other commodity group shows a drop at all comparable to this.

"So great a shrinkage in our prices during a year when consumptive demand was increasing and when commodity prices, in general, were rising, is convincing proof of how sensitive this industry is to the free operation of the law of supply and demand, and of the competitive forces that are always at work in the industry. Plainly, the industry has been passing on to the consumer the benefits of the important technologic advances it has been achieving. These have been seen in every department; scientific methods in the search for oil deposits; economies in transportation due to expansion of the pipeline system; use of larger and faster tankships and bigger and more efficient trucks; and revolutionary improvements in refining. A recent authoritative calculation concluded that the industry is now spending some $22,000,000 annually in technologic research."

Shipyards Rushed

An indication of how shipyards are being pushed to the limit is contained in the annual statement of the Sun Shipbuilding & Dry Dock Co. In 1940 it delivered 3 cargo vessels, 7 oil tankers, and 2 seatrains. However, at the end of the year the company was working on 8 cargo vessels, 4 passenger-cargo vessels, 32 tankers, 3 destroyer tenders and 3 seaplane tenders, and the company was putting up 4 new shipways, in addition to the 8 it now has. The total business now on their ways amounts to $192,000,000.

During the year the ship company increased its payroll from 5877 to 6582.

In that time, the Sun Oil Co. increased its oil company employes from 9698 to 10,772, and the two combined, increased their payroll from $31,941,915 to $36,868,059. Certainly the oil industry is doing its share toward unemployment.

Modernize Stations To Increase Sales Was Policy in 1940

CHICAGO, April 14.—Carrying out a program of rehabilitating owned service stations, Standard Oil Co. (Indiana), and subsidiaries, modernized 391 outmoded structures in 1940, "thereby acquiring practically new units which offer an attractive invitation to business," the company's 1940 report to stockholders stated.

Report also disclosed that retail outlets handling the companies' products were reduced from 35,678 in 1939 to 34,491 in 1940; bulk plants from 4,704 to 4,674, as result of the Indiana group's efforts to consolidate distributing facilities. Despite the reduction in number of outlets, volume of sales by Indiana Standard and subsidiaries increased 3.3% over 1939, while dollar sales were up 4.1%.

Net Profit Lower

Consolidated net profit of Indiana Standard decreased from $34,142,642.75 in 1939 to $33,597,341.66 in 1940. The company paid out in taxes a total of $120,473,097, "which is about 8.1% of the estimated total tax bill reported for the entire petroleum industry", report said. During 1940, the Indiana Standard group spent $48,000,000 for properties of which $20,500,000 was for production facilities, $9,000,000 for pipelines, $8,000,000 for manufacturing facilities, $9,000,000 for improved marketing facilities, and $1,500,000 for marine equipment.

Increase Truck Hauls

"Trucking of products from refineries and terminals to such bulk plants and dealers as can be reached most economically by highway transportation was increased last year. Twenty-four trucks were added to our fleet and 37 more are on order for that purpose. Contract carriers were most extensively employed. Our business with the railroads nevertheless continued at a high level," report said.

Plans for increasing the company's refined products pipeline mileage during 1941 include extending the line from Council Bluffs, Ia., to Sioux Falls, S. D., running a branch from Burlington Junction, Mo., to Des Moines, Ia., and construction of a new line from Whiting, Ind., to Indianapolis. The Indiana Standard group now owns 7,068 miles of trunk lines and 2,249 miles of gathering lines.

Barging Extended

"Facilities for inland river distribution of products were provided with the building of a towboat and 4 barges and with the completion of terminals on the Mississippi River at Cape Girardeau, Mo., Bettendorf, Ia., and Winona, Minn. A large volume of our goods is now moving at a reduced cost from the Wood River refinery to these points. We also barge goods via the Ohio River to Evansville, Ind. Pan American started building a new ocean-going tanker, to be delivered in 1941. It built also a towboat and 4 barges to carry crude from Louisiana and Texas Coastal fields to the Texas City refinery. Our marine equipment now includes 11 ocean and lake tankers, 9 towboats and 39 barges. Total carrying capacity is 1,199,237 bbls. These boats carried 40,058,331 bbls. of crude and products during the year," report said.

Appeal Blaustein Suit

Suit of the Blaustein family against Indiana Standard, which was settled in 1940, holding Indiana Standard had "dominated" Pan American Petroleum & Transport Co. and therefore became a constructive trustee for it, was reviewed in the company's report. Report said, in part: "An appeal has been perfected and is now pending. We are advised by able counsel that the decision of the trial court expanded the scope of fiduciary obligations beyond known precedent. Since our company has a large investment in Pan American, it believes it has an obligation to see that Pan American has a management competent to conduct affairs safely and properly. It is felt the Appellate Courts will so decide."

Defense Booms Virginia

Special to N. P. N.

RICHMOND, April 14.—Virginia, which has over a billion dollars in defense appropriations and contracts, is consuming nearly one-third more gasoline this year than last. State tax figures for January-February show consumption totaled 68,349,279 gals. this year as compared with 51,732,213 gals. in same two months of 1940. This was an increase of 32.1%, even though February had one less day this year than in 1940. (See page 18 for article on oil marketing boom in Norfolk-Portsmouth-Newport News area of Virginia.—EDITOR.)

Wage-Hour Provisions Held Applicable To Oil Jobber Operating in 7 States

N. P. N. News Bureau

CHICAGO, April 12.—Injunction restraining Martin Oil Co., Carbondale, Ill., from violating minimum wage and overtime provisions of the Wage-Hour Act and providing for payment of $2059 to 12 employes, has been signed by Federal Judge Fred L. Wham, at East St. Louis, Ill. Company had consented to the injunction.

Martin Oil operates a chain of service stations in 7 Mid-Western states, but the action of the Wage-Hour Division affects only bulk plant, office and maintenance employes of the company's Carbondale, Ill., bulk plant. The company said it does not operate "interstate" bulk plants in other states.

Regarding the operation cited by the Wage-Hour division, the complaint stated:

"Substantial portion of all the goods warehoused, sold and distributed by the defendant (Martin) at its place of business has been received by the defendant from states other than the state of Illinois, and is transported, sold and distributed in interstate commerce by the said employes of defendant within the state of Illinois and certain of the goods warehoused out of the said place of business in the state of Illinois are sold in interstate commerce from within the state of Illinois to without the state of Illinois".

Director of the Wage-Hour division, Thomas O'Malley, also reported that an injunction against William S. Worthy, Centralia, providing payment of $1339 to 47 employes was signed by Federal Judge Walter C. Lindley at Danville. Worthy, the director states, is engaged in servicing oil wells, and was also restrained from violation of the overtime and record keeping provisions of the act. Defendant consented to the decree, Division added.

Burner Shipments Rise

N. P. N. News Bureau

WASHINGTON, April 9.—Shipments of oil burners amounted to 16,091 in February, as compared with 16,203 in January, 1941, 11,522 in February, 1940, and 7,674 in February, 1939. Statistics for 1941 are for 159 manufactures, those for 1940 are for 170, and for 1939, 178.

Texas' Gov. O'Daniel Urged By House To Run For Election To U. S. Senate

AUSTIN, April 12.—Gov. W. Lee O'Daniel of Texas has announced that he will "take plenty of time" in appointing a successor to the U. S. Senate seat left vacant by the death of Sen. Morris Sheppard.

Meanwhile, the Texas House passed a resolution urging Gov. O'Daniel to resign, take the Senate appointment, and later run for the office. The resolution recalled the nation-wide interest Gov. O'Daniel had stirred up with his anti-violence law governing labor disputes, and asserted that the Senate needs seasoned statesmanship. Resolution also said Gov. O'Daniel would be of "inestimable value" in supporting federal extension of the strike and anti-violence legislation.

Under Texas law, the governor is empowered to appoint a temporary senator, and required to call a special election within 60 days to fill the vacancy.

Several courses are open to Gov. O'Daniel if he should want the office. He could resign his governorship with the understanding that Lt. Gov. Coke Stephenson would appoint him senator, and then stand for election within 60 days. Or, he could keep his present office, appoint someone to the senate for the 60-day period who could not run, and announce his candidacy. The latter course is believed the most logical if he should decide to run.

J. M. West of Houston, oil man-publisher, is being prominently mentioned in Texas political circles as a possible appointee to fill the vacancy, and if Gov. O'Daniel should decide to run, it is expected that he would appoint someone like Mr. West, who would like to have the honor but who is not politically ambitious.

It is generally conceded that O'Daniel could easily win the election if he chooses to run. Last year, he won the governorship without a run-off over a strong field of candidates. In the special election, regardless of how many candidates there are, the one with the most votes wins without a run-off vote.

Another candidate believed sure to run is Congressman Martin Dies of Orange, Tex.

From all kinds of oil

Plants dependent on a variety of producing fields for their crudes are compelled to install the processes that give the flexibility which elsewhere might be attained by selecting oils for processing — H. STANLEY NORMAN, OIL AND GAS JOURNAL, March 6, 1940

That is just another way of saying that many refiners have to make the best of whatever kinds of crude they can get and they need flexible refining processes to do it

And it's just another way of saying that they need Dubbscracking, U. O. P. catalytic polymerization and the other processes available through Universal to all refiners—and the friendly and effective help of U. O. P. refining specialists to adapt those processes to the particular needs of individual refiners

More and more refiners are finding that out and joining the family of Universal licensees

How about you?

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

'Oily' Bills Generally Favorable As 19 State Legislatures Adjourn

NEW YORK, April 14.—Although bills threatening adverse regulation or increased taxation of highway users and petroleum products have been considered by many state legislatures during current sessions, those bills which have been passed and approved are for the most part of a favorable nature, according to a bulletin released the past week by the National Highway Users Conference.

At the end of the first 3 months of the legislative year, 19 regular and one special (Utah) state sessions have adjourned sine die.

Substantial gains to highway users have been secured in the field of size and weight limits, and increased gasoline tax proposals in several states have thus far failed to materialize, or have been acted upon unfavorably.

Weight Limits Raised

Legislators during current sessions have shown active interest in defense highway needs, and the trend toward raising size and weight restrictions on trucks in harmony with recommendations of the American Assn. of State Highway Officials is noticeable. Texas' notorious 7000-lb. load limit was increased to a gross weight maximum of 38,000 lbs.; Tennessee increased its gross weight limit from 24,000 to 30,000 lbs.; Georgia adopted A. A. S. H. O. recommendations; a new Vermont law substitutes 650 lbs. per inch of tire width in lieu of a 16,000 lb. axle limit; and regulations more closely conforming to A. A. S. H. O. recommendations have been enacted in Arizona, Indiana and North Dakota. Similar bills died in North Carolina, Oregon, South Dakota, Washington and Wyoming. A new South Dakota law, however, permits over-length and over-weight operations in order to furnish transportation facilities to communities where service has been abandoned by railroads.

"Remedial action in current legislatures focuses attention on the remaining bottleneck states such as Kentucky and Alabama, whose legislatures are not in session this year," National Highway Users Conference says.

Constitutional amendments to prohibit diversion of highway funds have been introduced in 19 states, receiving passage in 3 and dying in 7. Remaining 9 states still have this measure under consideration.

'Gas' Tax is 'Status Quo'

So far, no increases in state gasoline taxes have been enacted, despite proposals in California, Connecticut, Kansas, Maine, Missouri, New Mexico, Oklahoma and South Carolina. Bills to reduce gasoline tax rates have been submitted in Arizona, Michigan, Oregon, Rhode Island, South Carolina, South Dakota and Texas, but have also failed of passage. Gasoline tax picture has remained unchanged with continuance of "emergency" taxes in New York, North Dakota, Ohio and West Virginia.

Diesel fuels have been newly taxed either by extension of gasoline tax laws or by imposition of "use fuel taxes" in Arkansas, Arizona, North Carolina, South Dakota, Tennessee, Utah and Wyoming. Such bills are still pending in Maine, Nebraska, New Mexico and Texas.

Repeal of Indiana's unpopular and highly complicated tire weight tax was a highlight of that session. Mileage tax bills were offered in 7 states but either died or failed to receive support. Truck fees have been reduced by new laws in Maine and Tennessee.

Week-End Bans Fail

One of the most important threats to highway transportation are the threats of prohibition or limitation by law of truck operations on weekends and holidays. These bills, generally sponsored by competing forms of transport, have been killed in Arkansas, Indiana, Iowa, Maryland, Oregon, Tennessee and Vermont so far during current legislative sessions. Like proposals are still pending in Colorado, New York, Ohio and Texas.

Closely allied with the weekend truck ban is the proposal to restrict the quantity of gasoline that may be transported by trucks. Measures of this type died in Indiana, Maryland, North Carolina, South Dakota, Vermont and Wyoming, but are still pending in Colorado, Connecticut, Minnesota, Missouri, New York, Ohio, Pennsylvania, Rhode Island and Texas.

NPN's Log On Oil Legislation

Oil legislative information, summarized below, is based on reports deemed reliable although NATIONAL PETROLEUM NEWS assumes no responsibility for the accuracy or completeness of this information.

Congress

Changed Status

HR-4146, Boland, Penna.
Extends bituminous coal act for 2 years with minor changes. Signed by President.

HR-2788, Woodrum, Va.
Includes appropriations for resources planning board, FTC, public roads, and Maritime Commission. Signed by President.

S-178, O'Mahoney, Wyo.
Authorizes Interior Secretary to issue 10-year leases to certain Lance Creek Field, Wyo., operators now producing under placer mining claims. Passed Senate.

Bills Introduced

Missouri

H-543, Smith
Provides for storage, handling and utilization of liquefied petroleum gases.

New Jersey

S-290, Zink et al
Appropriates $6,500,000 of motor fuel taxes to state municipal aid administration. To Municipal Aid Committee.

New Mexico

H-306, Lopez
Requires land commissioner's approval of all state oil lease arrangements. To Oil Committee.

Pennsylvania

H-1151, Woodside
Transfers $4,150,000 from motor license fund to general fund for deficiency appropriations for public assistance.

Changed Status

California

A-1812, Heisinger
Same as A-1813, 14, 15 and 16. Increases gasoline tax to 3.5c per gal., and reduces auto registration fee to $2. Withdrawn.

SJR-10, Biggar
Memorializes Congress to repeal federal gasoline tax or to require funds to be apportioned to the states. Passed Senate.

S-396, Fletcher
Exempts materials sold to contractors on cost-plus-fee basis for national defense contracts from sales and use tax. Withdrawn.

Connecticut

H-1736, Stuart
Same as S-2495. Requires posting of gasoline octane rating. Killed in House.

H-1737, Stuart
Same as S-2496. Provides that all tests to determine octane rating of gasoline shall be made by sealers of weights and measures. Killed in House.

S-1088, Downes
Compulsory auto liability insurance. Killed in House.

Iowa

S-418, Evans
Provides for weighing and inspection of motor vehicles and trailers. To Governor.

Kansas

H-282, Harkness
Same as S-222. Provides penalty for giving or receiving rebates in motor carrier rates. Killed in House.

H-378, Mayhew
Provides that payment of taxes by distributors, manufacturers or importers of motor fuels before 25th of each month shall entitle him to a 3% reduction as reimbursement for overhead in collecting tax and loss sustained in non-collection. Killed in House.

H-211, Fowler
Provides that gasoline without name or brand shall have "no brand" stamped on the pump. Killed in House.

H-40, Mayo
Increases deductable allowable to a wholesale distributor for losses and other expenses from 2 to 3%. Killed in House.

S-274, Dale
Authorizes State Corporation Commission to prevent "unreasonable discrimination" in production and sale of crude. Killed in Senate.

S-316, Cron and Walters
Regulates abandonment of oil and gas wells drilled for exploratory purposes. Requires owners of such wells to post bond. Killed in Senate.

S-269, Assessments and Taxation
Taxes motor fuels 3c per gal. for highway construction. Provides for monthly reports, licensing and posting of bonds; provides for records of all fuel purchased, sold or delivered by all persons engaged in transporting fuel. Passed House.

Maine

H-1479, Richardson
Imposes tax of 4c a gal. on motor fuels other than gasoline. Tabled.

Minnesota

H-259, Swanson, et al
Same as S-136. Apportions $1,200,000 of gas tax to state-aid roads. Passed Senate.

New Mexico

H-257, McCormick
Prohibits production of oil and gas by producers in excess of their share of the pool. Substitute bill passed House.

S-194, Dickason
Authorizes municipalities to levy 1c gasoline tax to retire special assessment bonds. Passed Senate.

New York

S-92, Page
Provides for acquisition by state of land and easements for highways. Passed Senate.

Vermont

H-183, Kirby
Requires tank trucks install sales ticket devices. Withdrawn.

Approved

Kansas

S-238, Assessment and Taxation
Provides no deduction be allowed for distribution of fuel exported from state; price signs on display and licensing.

S-346, Assessments and Taxation
Eliminates benzoil, benzene and naphtha from "motor fuels", also all combustible gases existing in gaseous state at 60 degrees F.

Minnesota

S-89, Weber, et al
Adds crude oil to tax exempt fuels on farms; must not be lighter than minus 16 Saybolt and have end point of not more than 465 F.

Texas Chain Tax Repeal Would Nullify Suit

Special to N. P. N.

AUSTIN, April 12.—Atty. Gen. Gerald Mann warned Texas Legislature this week that repealing chain store tax would nullify state suit of $900,000 against Humble Oil & Refining Co. for back taxes. Repeal bill has been voted favorably out of committee and stands fair chance of passage, it is said.

Mr. Mann also said utility chains which sell appliances are liable, that one has paid and he is preparing to file suit against another. (See NPN, Oct. 9, 1940, p. 13, and Feb. 5, 1941, p. 16.)

WITH THE ASSOCIATIONS

E. P. Hayes Elected A.P.I. Chairman Of Southwestern Production Division

HOUSTON, April 14. — E. P. Hayes, Houston, The Texas Co., has been elected chairman of the American Petroleum Institute's Production Division for the southwestern district, according to announcement by the Institute this week. Vice presidents, elected to represent various sections in the district, are: S. E. Buckley, Humble Oil & Refining Co., Houston; W. H. Collins, Shell Oil Co., Inc., Witchita Falls, Tex.; D. A. Jordan, The Atlantic Refining Co., Odessa, Tex.; E. B. Miller, Jr., Tide Water Associated Oil Co., Kilgore, Tex.; Maston Nixon, Southern Minerals Co., Corpus Christi, Tex.; J. H. Rambin, The Texas Co., New Orleans; and John D. Trimble, Bailey & Trimble, El Dorado, Ark. R. H. McLemore, Sun Oil Co., Dallas, is secretary-treasurer. L. A. Ogden, The Pure Oil Co., Fort Worth, was elected chairman of the district's advisory committee.

Members of the committee are: O. C. Bailey, Bailey & Trimble, El Dorado; L. E. Barrows, The Texas Co., Houston; E. H. Blum, The Atlantic Refining Co., Dallas; Al Buchanan, Al Buchanan Drilling Co., San Antonio; A. R. Campbell, Mid-Continent Oil & Gas Assn., Shreveport; M. G. Cheney, Anzac Oil Corp., Coleman, Tex.; S. A. Childress, Rio Bravo Oil Co., Houston; A. J. Cunningham, Standard Oil Co. of Texas, Houston; Charles Fitzgerald, Sinclair Refining Co., Fort Worth; J. J. Frommer, The Ohio Oil Co., Dallas; J. E. Howell, Lion Oil & Refining Co., El Dorado; C. W. Hughes, Arkansas Natural Gas Co., Shreveport; R. B. Jones, Panhandle Refining Co., Witchita Falls; E. A. Landreth, Landreth Production Corp., Fort Worth; Harry Leonard, New Mexico Oil & Gas Assn., Roswell, New Mex.; A. G. Levy, Fohs Oil Co., Houston; A. M. McCorkle, Stanolind Oil & Gas Co., Houston; R. S. McFarland, Seaboard Oil Co., Dallas.

Also, M. J. McLaughlin, Magnolia Petroleum Co., Dallas; J. R. McWilliams, Louark Producing Co., Shreveport; L. M. Moffitt, Triangle Drilling Co., Shreveport; W. S. Morris, East Texas Engineering Assn., Kilgore, Tex.; P. C. Murphy, Phillips Petroleum Co., Houston; E. L. Rawlins, Union Producing Co., Shreveport; Gordon Richmond, Hughes Tool Co., Houston; J. A. Ritter, Sun Oil Co., Dallas; C. F. Roeser, Roeser & Pendleton, Fort Worth; A. H. Rowan, Rowan & Nichols Oil Co., Fort Worth; E. Rubsamen, Trinity Drillers, Inc., San Antonio; J. H. Russell, Gulf Oil Corp., Houston; E. H. Salrin, Tide Water Associated Oil Co., Houston; M. C. Sells, Sells Petroleum, Inc., Longview, Tex.; C. G. Staley, Lea County Operators Committee, Hobbs, New Mex.; J. R. Suman, Humble Oil & Refining Co., Houston; C. E. Sutton, The Pure Oil Co., Houston; T. E. Swigart, Shell Pipe Line Corp., Houston and E. P. Hayes, The Texas Co., Houston, (ex-officio).

'Gas' Tax Revenue Hiked By Defense

ATLANTA, April 12. — Huge increase in gasoline tax revenues as the defense program creates new jobs and raises standards of living was predicted by Neil W. Printup, secretary, Georgia Petroleum Industries Committee, in reporting Georgia's 1940 gasoline tax collections as $22,802,364.66.

"Substantial gains in revenue may be expected during the next few years if the current business upswing continues," he said. "The national defense program will accelerate the use of highways, thereby adding to gasoline tax revenue. If, as the U. S. Secretary of Labor has predicted, 6,000,000 jobs will be created in 1941 in this country, breaking the back of unemployment, then substantial numbers of families will be able to elevate their standards of living by purchasing new and used automobiles. The immediate future indicates a continuation of the natural expansion of gasoline taxes to the federal government."

All Dealers Urged To Oppose 'Repeal' Of 'Fair Trade' Act

CLEVELAND, April 14. — Repeal of the Miller-Tydings Act, as proposed in HR 3821 now before Congress, was vigorously opposed by the executive committee of the National Assn. of Petroleum Retailers at a meeting in Milwaukee on April 10.

In a resolution, executive committee urged all retail dealers and associations to individually oppose repeal of the Act—an enabling act which endorsed the various state fair trade laws—and to express their opposition to its repeal through letters and telegrams to their respective congressmen.

In announcing its resolution, the NAPR executive committee said:

Text of Resolution

"This act is regarded as being the climax of Department of Justice opposition to fair trade statutes, as voiced by Thurman Arnold of the Department of Justice and Miss Harriet Elliott of the Consumers Division of the National Defense Board. . . Mr. Thurman Arnold has repeatedly stated that in his opinion 'bitter-end' competition is what the Government and the public want in the sale at retail of petroleum products. Miss Harriet Elliott of the Consumers Division of the National Defense Commission has repeatedly stated that she is opposed to fair trade laws because they increase prices to the consumers. The National Association does not believe that bitter-end competition, resulting in the bankruptcy of thousands of individuals is necessary in order to provide FAIR retail prices for the consumers. Statistics available in dozens of industry trade journals will prove beyond any doubt that retail prices to the consumers in the petroleum industry are lower than national average in any other industry."

Dr. Midgley Honored By Chemical Society

N. P. N. News Bureau

NEW YORK, April 14.—The Priestly Medal, highest honor bestowed by the American Chemical Society, was awarded at the Society's 101st meeting in St. Louis last week to Dr. Thomas Midgley, Jr., of Worthington, Ohio.

Dr. Midgley, who is vice-president of the Ethyl Gasoline Corp. and chairman of the board of directors of the American Chemical Society, was the discovered of tetraethyl lead, and is also known for his work on air-conditioning refrigerants. He was born 51 years ago in Beaver Falls, Pa., and was graduated from Cornell University.

Dr. Midgley also holds the Nichols Medal of the Society's New York Section, and the Perkin Medal of the Society of Chemical Industry. Wooster College has conferred upon him the honorary degree of doctor of science. Following the Detroit meeting of the American Chemical Society in September, 1940, Dr. Midgley was stricken with infantile paralysis but is now well on the way to recovery. He was an active participant in the St. Louis sessions of the Society and is still directing research.

Thomas Midgley, Jr.

Natural Gas Group Meets April 23-25

N. P. N. News Bureau

TULSA, April 12.—When the twentieth annual convention of the Natural Gasoline Assn. of America meets April 23-25 at Baker Hotel, Dallas, results of research projects sponsored by this group will be discussed in detail.

Dr. F. H. Dotterweich, Kingsville, Texas A. & I. College, will summarize the process whereby a growing number of valuable synthetic products may be made from individual hydrocarbons in natural gas.

Among subjects to be discussed is a new coal method for determining the gasoline content of natural gas, new volume correction factors for liquefied petroleum gases and new light on the variables in Reid vapor pressure determinations.

George P. Bunn, Bartlesville, Phillips Petroleum Co., will open the meeting with the president's address.

"Natural Gas and Gasoline in National Defense" will be discussed by Elmer Schmidt, Dallas, vice-president of Lone Star Gas Co. (For additional information on this meeting, see NPN, April 2, p. 19.)

API Names Robinson To Producers Group

LOS ANGELES, April 12.—American Petroleum Institute's Production Division, Pacific Coast District, elected Bruce H. Robinson, Los Angeles, General Petroleum Corp., as chairman for 1941-42 at the district's spring meeting here recently.

Vice-chairmen elected were: E. L. Davis, Los Angeles, The Texas Co., for the Los Angeles Basin; R. W. Borden, Elwood, Calif., Barnsdall Oil Co., for the Coastal District, and Paul E. Lehr, Bakersfield, Calif., Shell Oil Co. Inc., for the San Joaquin Valley.

W. G. Corey, Los Angeles, Pacific Gear and Tool Works, is treasurer, and D. S. Kilgour, Los Angeles, California Oil & Gas Ass'n., is secretary. R. N. McMaster, Los Angeles, Chanslor-Canfield Midway Oil Co., was elected chairman of the district advisory committee.

Members of the advisory committee are: L. L. Aubert, Bankline Oil Co., Los Angeles; A. H. Bell, Continental Oil Co., Los Angeles; L. A. Cranson, Honolulu Oil Corp., San Francisco; J. F. Dodge, University of Southern California, Los Angeles; E. G. Gaylord, Standard Oil Co. of California, San Francisco; E. B. Hall, Hall-Baker Co., Los Angeles; W. L. Heater, Baroid Sales Division, Los Angeles; R. P. Huggins, Western Gulf Oil Co., Los Angeles; Joseph Jensen, Tide Water Associated Oil Co., Los Angeles; Wm. Keck, Jr., Superior Oil Co., Los Angeles; and R. L. Keyes, The Texas Co., Los Angeles.

Also W. N. Lacey, California Institute of Technology, Pasadena; M. A. Machris, Wilshire Oil Co., Los Angeles; R. D. Montgomery, Richfield Oil Corp., Los Angeles; R. C. Patterson, U. S. Geological Survey, Taft; B. E. Parsons, General Petroleum Corp., Los Angeles; H. C. Pyle, Union Oil Co. of California, Los Angeles; E. E. Pyles, Hancock Oil Co., Long Beach; Bruce H. Robinson, General Petroleum Corp. of Calif., Los Angeles (ex-officio); J. D. Sutherland, The Ohio Oil Co., Los Angeles; C. P. Watson, Seaboard Oil Co., Los Angeles; H. T. Wyatt, Shell Oil Co., Inc., Los Angeles; W. C. Whaley, Barnsdall Oil Co., Los Angeles.

GCRA 'Gas' Stocks Increase in March

HOUSTON, April 11.—Gasoline stocks at plants of Gulf Coast Refiners Assn. members increased 107,040 bbls. during last half of March to 2,216,693 bbls. as of April 1, according to G. C. R. A. report today.

Kerosine stocks decreased 13,324 bbls. to 278,143 bbls.; No. 5 fuel, 9566 bbls. to 154,709 bbls.; and gas oils other than diesel, 59,920 bbls. to 492,336 bbls. Stocks of Bunker "C" fuel were up 40,392 bbls. to 345,170 bbls., and diesel gas oils increased 34,698 bbls. to 581,972 bbls.

Crude runs to stills of G. C. R. A. refiners totaled 1,002,250 bbls., or 59.9% of rated capacity. Operations for entire coastal refining industry were above 90% of rated capacity.

Ohio Oil Builds 'Poly' Unit At Robinson, Illinois, Plant

CHICAGO, April 11.—Ohio Oil Co. has signed a license agreement with Universal Oil Products Co. and is installing a U. O. P. non-selective catalytic polymerization unit at its Robinson, Ill., refinery, Universal announced today.

The unit was designed by Universal engineers and is being built by Ohio Oil. Charge for the unit will be the higher olefins produced in cracking by four Holmes-Manley units and one Kellogg unit.

New stabilization equipment is being installed to stabilize the cracked gasoline and prepare the charge for the poly unit.

Mid-Continent Rail Rates Reduced By Order of ICC

(*Continued from page* 5)

ICC's decision on 28106. Shown below are rates prescribed in the ICC decision as "maximum," together with a comparison of present rates with those proposed in the two dockets. Rates are in cents per gal. of gasoline shipped from Group 3 points to representative distinations.

Group 3 Rates

Group 3 to:	ICC Prescribed "Maximum" rates	Present Rates	Proposed Rates SWFB 24106	Am't. Cut (Proposed rates under present)
Kansas City, Mo.	1.45c	1.84c	1.25c	0.6c
St. Louis, Mo.	1.91	2.17	1.65	0.52
Des Moines, Ia.	1.91	2.37	1.65	0.72
Sioux City, Ia.	2.11	2.64	1.78	0.85
Omaha, Neb.	1.91	2.37	1.65	0.72
Sioux Falls, S. D.	2.24	2.90	1.91	1.00
Effingham, Ill.	2.11	2.64	1.78	0.85
Peoria, Ill.	2.17	2.57	1.84	0.72
Wausau, Wis.	2.77	3.36	2.37	1.00
Rhinelander, Wis.	2.83	3.56	2.44	1.12
Minneapolis, Minn.	2.44	3.03	2.04	1.00
Duluth, Minn.	2.70	3.42	2.31	1.12
St. Cloud, Minn.	2.57	3.43	2.17	1.25
Marquette, Mich.	3.10	4.15	2.64	1.51

85% of 'Maximums'

From other southwestern origin points, including the Baton Rouge-New Orleans group, existing differentials over or under Group 3 rates will be maintained, according to provisions of the proposal. To destination points in Western Trunk Line, Southwestern Freight Bureau and Illinois Freight Assn. territories not named in the docket, the proposal prescribes rates 85% of those set forth as "maximum" in the ICC decision.

Reason for the reductions in rates set forth in the proposal is given by carriers as follows: "It is the opinion of many of the shippers that the rates ordered to be established by the ICC in its decision covering Docket 28106 decided March 11, 1941, will not permit the railroads to retain the business which they are now handling or permit them to regain any additional business in competition with the pipeline, in view of the fact that the ICC in the same decision has ordered greater reductions in the pipeline rates than they ordered in the rail rates."

Rail shippers hailed the proposal as an answer to their "prayers" to the ICC for elimination of "discriminatory" transportation charges made in their complaint in the P.R.S.A. case. In effect, the rails have docketed the suggestions of Interstate Commerce Commissioner Splawn that rates 85% of those named in the ICC decision as "maximum" are "reasonable" both to rails and the shippers, it was said.

Significant, according to rail shippers, is that this proposal is made at the request of carrier rails and that the proposed rates may also apply to other petroleum products than gasoline and kerosine. Heretofore, it was pointed out, most major proposals for reduced petroleum rail rates from the Southwest have been docketed on request of shippers.

While officials of Petroleum Rail Shippers Assn. have made no public statement regarding their reaction to the proposal, individual rail shipping refiners have indicated the proposed rates would enable them to be "competitive" with other forms of transportation to most destinations. Exceptions mentioned may include some pipeline and water terminal points, it was said.

ICC Calendar On Oil Trucking

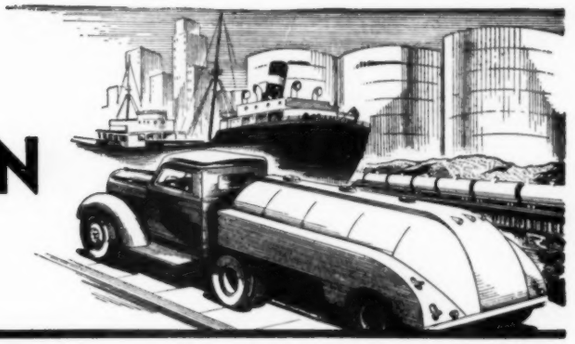
Kirbery Transportation Inc., Bayonne, N. J., (MC 50413, sub. 1). Application to operate as a contract carrier of gasoline, kerosine and heating oil, in tank trucks, from points in Hudson, Union, Middlesex, and Essex Counties, N. J., to points in New York, New Jersey, and Pennsylvania, within 150 miles of New York, N. Y., over irregular routes, denied.

Globe To Let Contract For 225-Mile Pipeline

WICHITA, Kan., April 14.—Contract for construction of its proposed 225 mile, 6-inch pipeline from McPherson, Kan., to Council Bluffs, Ia., will be let later this week or early next week, according to announcement today by officials of Globe Oil & Refining Co.

The pipeline, which will cost approximately $1,000,000, will transport gasoline, tractor fuels, kerosine, and light burning oils from the Globe refinery at McPherson to Council Bluffs. No intermediate terminals are planned at this time, Globe officials said.

OIL TRANSPORTATION



ICC Cuts Oil Rail Rates From Southeast Terminals

N. P. N. News Bureau

WASHINGTON, April 11. — Interstate Commerce Commission today promulgated new low scale of minimum rates, effective May 14, on gasoline, kerosine, and fuel oil moving in tank-car loads from South Atlantic ports to the Carolinas, Florida and Southern Virginia, after cancelling 20% reduction proposed by railroads. (I & S Docket 4816)

New ICC minimums, applicable from Norfolk, Va., Wilmington, N. C., Charleston, S. C., Savannah and Brunswick, Ga., retain existing rates for first 150 miles. From 150 to 200 miles, present rates are to be reduced from 1 to 15c per cwt.

ICC Examiner Burton Fuller, in report to commission, recommended reduction of 1 to 14c per cwt. applicable after 210 miles. (See NPN, January 22) Railroads original proposal called for reductions of ½ to 18c per cwt. on all shipments moving more than 50 miles.

Effect of ICC decision is to retain existing scale, ranging from 5c for first 50 miles up to 15c for 150 miles. Beyond 150 miles, rates will be reduced as follows:

Dist. Miles	Present	New
150	15	15
155	16	15
160	16	16
170	17	16
180	18	17
185	19	17
190	19	18
200	20	18
210	21	19
215	22	19
220	22	20
230	23	20
240	24	21
245	25	21
250	25	22
260	26	22
270	27	23
275	28	23
280	28	23
290	29	24
300	30	24
305	31	25
310	31	25
320	32	25
330	33	26
340	35	26
350	37	27
360	39	27
370	41	28
380	43	28
400	—	29

"The present scale, with its relatively low rates for the shorter hauls, already appears to have reduced private carriage to a minimum," ICC declared in decision. "This is confirmed by the fact that the refiners, with the single limited exception above noted, have not seen fit to engage therein." (ICC had previously stated "Standard Oil Co.," during year ended September 30, 1940, had moved only 10%, 5,000,000 gals., of its requirements in its own trucks from South Atlantic ports.)

"As previously shown, approximately half of the traffic under consideration is by rail and half by truck. It is protestants' (competing truckers) position that the movement has become stabilized, and by reason of the advantages of rail transportation, respondents will continue to handle about the same proportion of the traffic. They contend that respondents will gain little, if any, additional traffic if the proposed rates are approved, but will lose over $540,000 in revenue based on the rail movement for the year ending September 30, 1940. In support of their contention, protestants referred to the failure of prior efforts of respondents, by successive reductions, to regain traffic lost to the trucks. Protesting motor carriers testified that they will establish whatever basis of rates may be approved in this proceeding for rail carriers."

ICC then declared "carriers may reduce rates on a given portion of their traffic provided that such rates are not unreasonably low or unjustly discriminatory against other portions of their traffic; in other words, provided the given traffic bears its fair share of the transportation burden. Where, as here, we have a relatively high-rated commodity which encounters competition with a regulated transportation agency and to a limited extent for the shorter hauls with a private agency, the rail carrier being the low-cost agency and the value of the service being substantially equal, the rail rates thereon, while properly relatively lower for the shorter than for the longer hauls, should not average substantially below full cost (that is, operating expenses plus return on investment). The question we are to determine is to what extent respondents have justified the proposed rates as reasonable minimum and otherwise lawful rates measured by the usual transportation standards under the various provisions of the act, including the provisions in the preamble as to preserving the inherent advantages of each regulated agency and as to unfair or destructive competitive practices and the provisions of section 15a (2) as to the effect on the movement of respondents' traffic, their revenue needs, and the public interest."

Coastwise Tanker Rates Continue Unchanged

NEW YORK, April 14.—Tanker market was reported quiet after the flurry of cargo trading that rounded out last week. No new fixtures were reported made over the week-end, and both "clean" and "dirty" rates for Gulf-N. Hatteras movement continued unchanged.

Last "clean" fixture was for 75,000 bbls. at 50c for gasoline, 53c for kerosine and 57c for No. 2 fuel oil. At the end of last week, 2 "dirty" boats were fixed at 50c for 30 gravity or lighter crude and 57c for 10-19.9 gravity fuel. All 3 fixtures were said to be for early May loading.

Lay Illinois Pipeline

Special to N. P. N.

TORONTO, April 14.—Toronto Pipe Line Co., subsidiary of British American Oil Co., has nearly completed laying 35 miles of pipe in the southern Illinois field, and is laying 9 miles of gathering lines near Cut Bank, Mont. It is expected that heavy demand will be made on the Montana fields during summer harvest and additional crude will be needed in western Canada, since with the Commonwealth air training program in full operation, the Turner Valley field will not be able to meet all demands.

Pipeline Rights Sought in East

Special to N. P. N.

HARRISBURG, Pa., April 14. —An application for state charter was filed today by the Union Pipe Line Co., Philadelphia, to construct and operate a pipe line across Pennsylvania from Marcus Hook to the Ohio state line in Washington county, on the Ohio River.

The corporation bureau of the state department, where the charter application was filed, explained that the papers, after being examined, will be turned over to the Public Utility Commission for further approval. Later, the papers will be re-submitted to the bureau for action on the charter.

The company is capitalized at $5000, or fifty shares at $100 par value, and the application for the charter was filed by Harry O. Ravis, 11 Nassau Road, Larchmont, N. Y. Subscribers and directors are listed as W. R. Argyle, 641 North Chester Road, Swarthmore, and M. Clyde Sheaffer, Shiremanstown, who acted as counsel for the company.

The Public Utility Commission, which must approve the construction of the pipeline before work can start, said previously that the work was being sponsored by Sinclair Refining Co.

The purposes of the company as set forth in the application are "transporting, storing, insuring, and shipping petroleum, and refined petroleum products, and to construct, maintain and operate such pipe lines, tanks, facilities and equipment (which facilities and equipment shall include but without limiting the generality of said terms, telephone, telegraph and (or electrical lines) as are necessary or proper for the conduct of said busines, said pipeline or pipelines to run within the commonwealth of Pennsylvania and within the counties hereinafter named, including a pipeline or pipelines beginning at or in the vicinity of the borough of Marcus Hook in the County of Dela-

ware and extending in a Northerly, Northwesterly and westerly direction, to the western boundary line of the commonwealth in Washington County, with branch and connecting pipe or pipelines and/or branch or connecting pipelines to extend through or into the counties of Delaware, Chester, Montgomery, Berks, LeHigh, Lancaster, Lebanon, Schuylkill, Dauphin, Northumberland, York, Perry, Cumberland, Adams, Juanita, Snyder, Franklin, Mifflin, Huntingdon, Fulton, Center, Blair, Bedford, Cambria, Clearfield, Somerset, West Moreland, Indiana, Fayette, Armstrong, Allegheny, Butler, Washington, and Beaver by such route or routes as may now or hereafter be approved by the Public Utility Commission of the Commonwealth of Pennsylvania."

McCollum Heads Carter Oil Company

TULSA, April 11. — L. F. McCollum, Tulsa, will become president of Carter Oil Co., effective May 1, succeeding J. J. Conry, who will retire after 40 years of service with Carter and other Standard Oil Co. (N. J.) subsidiaries, it was learned here today. Mr. McCollum is now executive vice-president and manager of Carter's exploration department.

Other personnel changes announced today were: O. C. Shorp, Tulsa, from vice-president and manager, production department, to executive vice-president; J. R. McWilliams, Shreveport, La., from president of Louark Producing Co. (merging with Carter) to manager of Carter's production department; Harold F. Moses, Tulsa, chief geologist, will take on added responsibilities as manager of Carter's exploration department; Condon C. Mackay, Tulsa, land division head, to assistant manager of the exploration department.

William A. Watkins, Mattoon, Ill., will move up from superintendent of the eastern division to the new southern division at Shreveport, which will encompass Louark's Arkansas and Louisiana production in addition to Carter's present operations in Mississippi and Alabama. Ralph E. Damp, Mattoon, will step from production manager, eastern division, to division superintendent.

New Mexico April Allowable Set

TULSA, April 14.—April allowable for New Mexico has been set at 110,000 bbls. daily, same as March, according to order of Oil Conservation Commission.

Proration Opponents Organize Group To Battle Conservation in Illinois

N. P. N. News Bureau

CHICAGO, April 12.—Opponents of proration in Illinois are drawing up their battle sights to fight the expected conservation measure which the administration has indicated will be introduced in the near future.

Farmers, land owners, downstate Illinois businessmen, and independent oil operators have formed the Illinois Oil and Farm Owners Equity Assn. This group has already held one meeting in southern Illinois and two more are planned for Mt. Carmel on April 14, and Harrisburg on April 17. It is expected that former governor John Stelle will speak at these meetings. At its first meeting this week at Mt. Vernon, a resolution hitting oil proration was passed and forwarded to Illinois' Governor Green. It urges the governor's opposition to the proposed legislation.

The resolution states that proration legislation "will foster and produce monopoly in the oil business and deprive the farmers and land owners of the state of the tremendous prosperity which has come to them from the development of the oil business . . . will drive the independent oil business from the state, and stifle the very life of a prosperous development which is just starting to spread into many portions of Illinois".

Harsh is President

George Harsh, Jr., of Centralia is president of the association, and Dorsey Hager is secretary. Included on the board are Mayor Homer Machim of Salem, Judge Virgil Mills of Fairfield, and B. E. Martin and A. B. Anderson, prominent southern Illinois businessmen. The latter is chairman of the board of the group.

Last week, Gov. Green appointed Clarence T. Smith of Flora, Ill., as his representative on the Interstate Compact commission, and this was construed as the first move in eventual complete cooperation with compacting states, through a proration law in Illinois.

Bill providing proration, it is understood, has already been framed, and it is expected it will be introduced in the legislature at any time. It provides for a minimum per well allowable of 40 bbls., except where the prevention of waste requires a lower per well allowable.

Illinois Passes Extension Of Interstate Oil Compact

N. P. N. News Bureau

NEW YORK, April 11.—The Illinois Senate on April 8 passed House Bill 131 which authorizes the Governor to extend the life of the Interstate Oil Compact for 2 years, to Sept. 1, 1943. This measure was introduced by Assemblyman Rennick and passed the House on March 12. As Governor Green and his administration have favored the proposal strongly, his signature is expected to make the bill law at an early date.

Hold Dual Completion Hearing

AUSTIN, April 14.—Question of dual completion of wells in the new Hawkins pool will be the subject of a public hearing ordered here April 23 by the Texas Railroad Commission. Several operators have asked permission to produce crude from Woodbine Horizon and gas from sub-Clarksville formation.

New Minnesota Bill Hikes 'Gas' Tax 1c

NEW YORK, April 11.—Governor Stassen of Minnesota on April 9 placed his signature on House Bill 374 which provides for a 1c hike in state gasoline tax, to 4c per gal. This measure, introduced by Assemblyman Covert, and others, on Feb. 6, was passed in the house Feb. 27 and by the senate on April 7. Bill becomes law 20 days after approval, making the tax increase effective April 29.

Tax Hike Proposal Killed

NEW YORK, April 15. — Maine Senate by a vote of 27 to 3 today turned down state Senator Holman's proposal to raise Maine's gasoline tax rate from 4 to 5c per gal. House had recently passed the measure, after turning down an unfavorable committee report.

May Tax Aviation 'Gas'

N. P. N. News Bureau

LOS ANGELES, April 12.—Attorneys in the office of the Los Angeles county council were reported to be investigating the possibility of levying a tax on aviation gasoline. Such a tax was advocated by the county board of supervisors when it recently created a county aviation department to administer monies received from the federal government for airport construction and operation.

Robinson-Patman Hearing To Be Held in Detroit

N. P. N. News Bureau

CHICAGO, April 15.—Hearing on Federal Trade Commission complaint against Standard Oil Co. (Indiana), charged with violation of Robinson-Patman Act, will be reconvened April 21, in Room 859 of the Federal Building, Detroit.

Indiana Standard is charged with selling gasoline to large Detroit retailers at tank car prices, allegedly lower than those paid by other retailers. Company has answered the FTC complaint.

1940 Oil Earnings Up for 23 Concerns

NEW YORK, April 5.—Annual reports issued thus far by leading U. S. oil companies indicate the petroleum industry's earnings last year showed a "moderate increase" over 1939, according to a summary of reports of 23 oil companies made by Carl H. Pforzheimer & Co., and released here this week.

Net income of the 23 companies in 1940 totaled $166,675,439, it was said, compared with $156,213,062 reported the previous year. Improvements were not general, the report stated, since 12 of the reporting companies had lower earnings in 1940 than the previous year.

"Failure of the oil industry to make a profit showing more in line with that of other industrial groups reflected the unsatisfactory markets which prevailed for gasoline during the greater part of the year," the summary said. In review, the report stated that after the first quarter of 1940, described as "one of the most profitable first quarters in its history," profit margins progressively narrowed as the year advanced, to be adversely affected in the final quarter by the necessity of providing for increased income taxes.

While all oil companies covered in the survey were affected by higher rates of tax imposed on normal corporate incomes last year, only 4—Pure Oil, Ohio Standard, Union Tank Car and The Texas Corp.—were subjected to the newly imposed excess profits taxes, report said.

Ethyl Reduces Price

NEW YORK, April 14.—Price of tetraethyl lead in new license and sales agreement of Ethyl Gasoline Corp., effective April 1, is reduced from 0.23 to 0.2c per cubic centimeter for all shipments.

U. S. Domestic 'Gas' Demand Increases 17% In February

(*Continued from page* 5)

dustrial purposes outweighed weather factor.

'Gas' Yields Increased

Lack of pressure on heating oils because of the relatively warm weather in February had a marked influence on yields of the major products, Bureau said, adding distillate fuel yield fell from 15.4% in January to 14.7% in February, whereas the gasoline yield rose from 42.8% to 43.3%.

February daily average crude production was 3,599,700 bbls., an increase of about 30,000 bbls. over January, but nearly 150,000 bbls. below February 1940.

Increase in the daily average production in February was distributed among all the major producing states except Illinois, where the steady decline, starting last summer, was continued. Michigan's daily average fell below 40,000 bbls. for the first time since July 1937.

Crude Stocks Up

Exports of crude oil continued to slump, but imports recovered from the decline of January. The increase in daily average crude runs to stills did not absorb all the new production, hence the balance of supply and demand for crude oil was again reversed, so that crude-oil stocks increased about 1,200,000 bbls. compared with a decline of about 800,000 bbls. in January.

Bureau of Labor Statistics price index for petroleum products in February 1941 was 50.0, compared with same in January and 50.9 in February 1940.

1st Region Army-Navy 'Gas' Demands Up 700% in July-September Quarter

N. P. N. News Bureau

WASHINGTON, April 10.—First region Army and Navy station demand for tank car gasoline (regular grade) during July-September quarter is estimated in Treasury Procurement Division bid invitation today at 5,901,223 gals., an increase of 700% over 891,656 gals. last year. Stations also plan to buy 800,799 gals. of tank car gasoline (premium grade), as against 224,000 gals. last year.

Regular grade gallonage, estimates for 1st region, by posts, for this year, together with those for last year (shown in brackets) follow: Edgewood Arsenal, Md., 173,000 (43,000); Fort George Meade, Md., 282,000 (47,000); Quartermaster Corps, Boston, Mass., 30,000 (21,000); Camp Edwards, Mass., 1,371,260 (none); Camp Devens, Mass., 100,000 (54,000); Westover Field, Mass., 110,000 (none); Naval Air Station, Lakehurst, N. J., 35,883 (32,000); Fort Monmouth, N. J., 192,000 (17,500); Schenectady General Depot, N. Y., 10,000 (13,875); Mitchel Field, N. Y., 95,000 (46,000); Camp Upton, N. Y., 54,000 (none); Plattsburg Barracks, N. Y., 30,000 (30,000); Madison Barracks, N. Y., 200,000 (none); Pine Camp, N. Y., 1,600,000 (none); West Point, N. Y., 51,800 (60,000); Fort Hamilton, N. Y., 20,000 (none); Brooklyn Port Quartermaster, N. Y., 35,000 (none); Fort Totten, N. Y., 23,000 (none); Indiantown Gap Military Reservation, Pa., 50,000 (none); New Cumberland General Depot, Pa., 4,000 (6,000); Frankfort Arsenal, Pa., 8,750 (7,500); Quartermaster, Philadelphia, Pa., 98,000 (57,200); Carlisle Barracks, Pa., 35,000 (35,000); Fort Adams, R. I., 9 000 (none); Naval Air Station, Quonset Point, R. I., 40,000 (none); Fort Ethan Allen, Vt., 66,780 (45,081); Marine Corps, Quantico, Va., 70,000 (70,000); Fort Belvoir, Va., 406,000 (32,000); Camp Lee, Va., 100,000 (none); Langley Field, Va., 75,000 (50,000); Camp Pendleton, Va., 120,000 (none); Fort Story, Va., 60,000 (none); Fort Eustis, Va., 15,000 (none); Ordnance, Radford, Va., 120,000 (none); National Guard Camp, Natick, Mass., none (11,000); Raritan Arsenal, N. J., 35,000 (35,000).

Premium grade gallonages for this year and last follow: Fort George Meade, Md., 94,000 (none); National Guard Camp, Natick, Mass., none (20,000); Naval Air Station, Lakehurst, N. J., 14,529 (16,000); Raritan Arsenal, N. J., 14,000 (none); Picatinny Arsenal, N. J., 46,000 (30,000); Delaware Ordnance Depot, N. J., 32,000 (24,000); Pine Camp. N. Y., 437,000 (none); Frankfort Arsenal, Pa., 5,000 (5,000); Naval Air Station, Quonset Point, R. I., 10,000 (none); Marine Corps, Quantico, Va., 100,000 (100,000); Nansemond Depot, Va., 8,000 (8,000).

Suman Sees Oil Shortage As Axis 'Achilles Heel'

AUSTIN, April 15. — There will be no oil bottleneck in the aid given by the United States to the democracies, John R. Suman, vice-president, Humble Oil & Refining Co., and president of the American Institute of Mining and Metallurgical Engineers, told University of Texas engineers today.

On the other hand, oil may prove the Achilles heel of the German war machine, he said.

"The total production of crude oil in Germany and Italy equals only 5% of our present domestic production," he stated. He said the U. S. now produces more than one-half of the world's crude oil, and that reserves here are 9 times greater than those of Russia, which is next in line.

"Our capacity for production of high-grade 100 octane gasoline for planes is twice that needed for both civil and military use," he told the engineers. "All this is without any loss by waste or any interference with regular consumers and exports."

Oil Import Figures Announced

N. P. N. News Bureau

WASHINGTON, April 10.—U. S. Bureau of Customs today announced preliminary figures on imports of crude petroleum and fuel oil within quota limitations provided under trade agreements, covering period January 1 to March 29, 1941, as follows: (in gallons)

	Established Quota For Calendar Year	Imports as of Mar. 29, '41
Venezuela	1,913,049,600	459,928,695
Netherlands	578,806,200	193,782,271
Colombia	86,956,800	10,355,189
Other (Mostly Mexico)	138,587,400	132,725,761

'Split-pump' Accounts Dropped by Union Oil

N. P. N. News Bureau

LOS ANGELES, April 12.—Effective April 1, Union Oil Co. discontinued all split-pump accounts in California, Oregon, Washington, Arizona and Nevada, according to company announcement today.

Products of the company will in future be handled in that territory exclusively through its 470 company-operated stations and about 4800 one-hundred per cent dealer outlets. Approximately 700 service stations were affected by the change in policy, with about 100 stations giving up competitive brands so that they might continue to handle Union products, company said.

Desire for uniform service at all its retail outlets is said to have been the cause of Union's change to a policy that had already been adopted by three other major companies operating in the state. Three major companies, The Texas Co., General Petroleum Corp., and Tide-water-Associated Oil Co., continue to operate through split-pump accounts as well as their regular company-owned stations.

DEATHS

Clifford Day Mallory

Clifford Day Mallory, 59, president of C. D. Mallory & Co., Inc., owners of a large fleet of tankers and cargo ships, died in a Miami Beach hospital last week following a heart attack. Mr. Mallory, famous as a sportsman and boating enthusiast, was first stricken several weeks ago aboard his yacht, "Bonnie Dundee".

* * *

Frank L. Chase

Funeral services were held April 3 at Columbus, Ohio, for Frank L. Chase, retired vice-president of Lone Star Gas Co. Mr. Chase died April 1 while enroute to Dallas, Tex., after a Florida vacation.

A well-known official of Lone Star, Mr. Chase maintained offices with the company after his retirement in 1939. He had been actively with Lone Star for 22 years.

Besides being a director of the former Natural Gas Assn. of America, Mr. Chase was a president of North Texas Technology Club, member of the Dallas Technical Club, and American Petroleum Institute central committee on measuring, sampling and testing natural gas and gasoline.

He leaves a wife and 2 daughters.

* * *

Dr. J. R. Bailey

Dr. James R. Bailey, petroleum research chemist for 50 years and a member of the University of Texas faculty, died March 25 following a paralytic stroke. He was 73 years old.

Dr. Bailey's laboratory at the University of Texas was the only one in the U. S. conducting research on petroleum bases. He was granted $16,000 in 1926 by the American Petroleum Institute for petroleum research, and when this was exhausted in 1931, the Union Oil Co. of California—supplier of the petroleum bases—granted a $1200 fellowship which expired in 1938. In all, Dr. Bailey isolated 32 nitrogen compounds derived from by-products of petroleum.

Virginia Oil Marketers Expand Facilities To Handle Billion-Dollar Defense Boom . . .

FROM CALIFORNIA and all over the U. S. come men to work in Virginia shipyards building warships. Until housing facilities are available, many families are living in trailer camps. There are 12,000 homes being built in Hampton Roads area. Some projects have hundreds of housing units. Pictured below is 1200-unit project, each with oil burner, at James River Bridge outside of Newport News

Virginia gasoline consumption, according to state tax figures, was up 32% in first two months this year but some marketers gained 100% in Hampton Roads area where the population is up 22% and 12,000 homes are building.

GASOLINE and fuel oil sales are up 100% for some marketers in the Hampton Roads area of Virginia where a billion dollars in Army and Navy contracts has brought about the biggest defense boom on the East Coast.

Population of this area, including the cities of Norfolk, Portsmouth and Newport News, has risen 22% to 485,000 since the 1940 census and is expected to reach 555,000 when the defense program is in full swing.

Thousands of out-of-state cars have brought men from all corners of the U. S. to work in the shipyards and on defense projects. So sudden was the influx that trailer camps fringe the cities and rooming houses sleep four and five men in a room. Workers on nearby construction projects are commuting by automobile from Richmond, 60 miles away.

Over 12,000 new homes are under construction in the Hampton Roads area, nearly all equipped with oil burners.

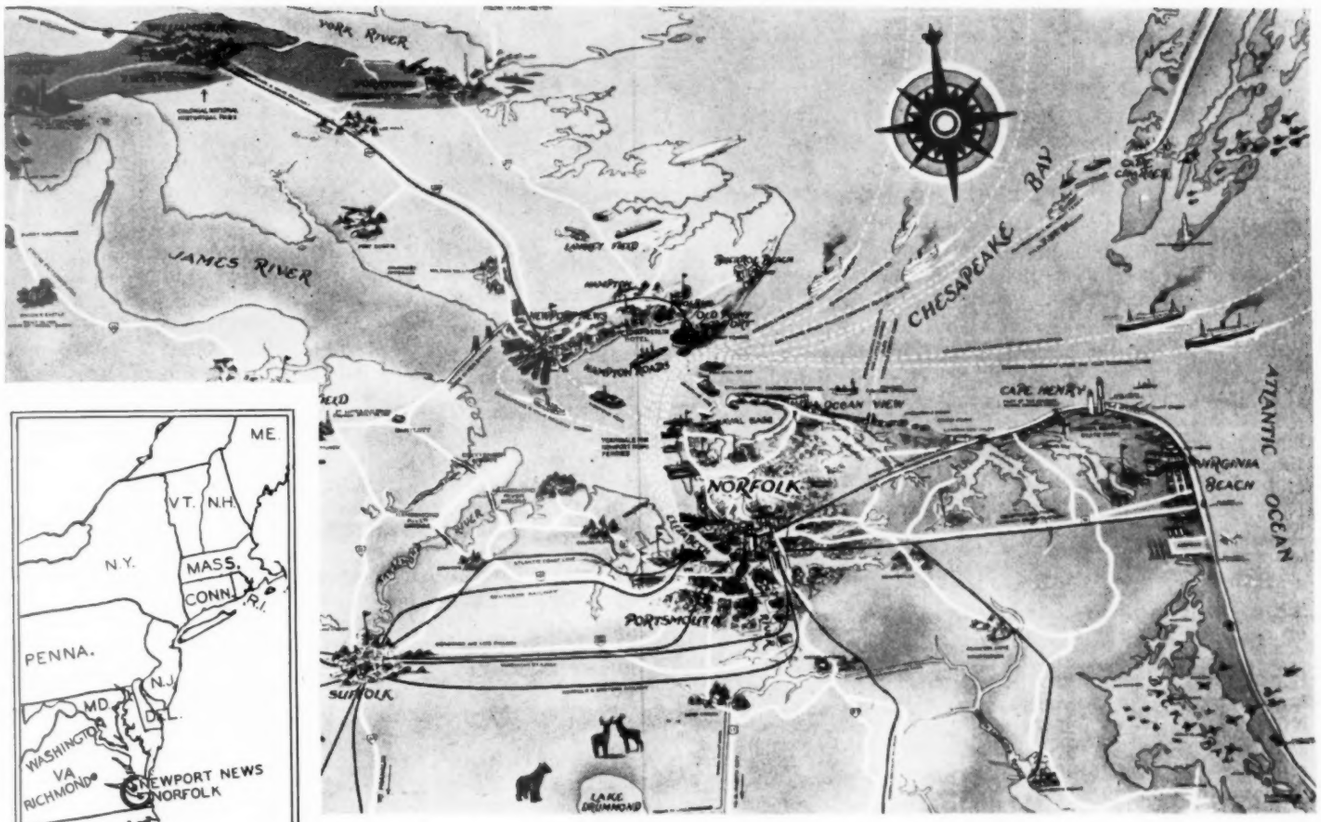
Gasoline consumption now is topping last summer's peaks but oil marketers are meeting all demands upon them and preparing to handle even greater volume in the next few months. Thousands of more employes will be taken on at the shipyards as soon as housing facilities can be constructed. Additional shipbuilding facilities are being rushed and when completed will provide still more thousands of jobs. This will add considerable to the already record-high gasoline consumption but an unprecedented tourist traffic this summer will push gallonage still higher.

Tidewater Virginia, with its nationally-known vacation resorts and historic Jamestown and Yorktown, and restored Williamsburg, has always been a "must" for tourists. But this year there are added thousands of magnets pulling at the heartstrings of people all over the East and South—the soldiers, sailors and marines quartered in the dozen posts in the Hampton Roads area.

Friends and relatives of the newly-inducted service men by the hundreds of thousands are expected to spend their vacations in this area, near their boys in uniform. And 80% will come by automobile, along the Ocean Highway that runs north and south through this area and by other routes that converge from the West.

Oil marketers hesitate to predict what will be the gasoline consumption this summer in Hampton Roads area but point out that the increase for the entire state was 32% in January-February, with the Norfolk-Portsmouth-Newport News percentage probably well over that figure.

But marketers are preparing to meet



Picture map of Hampton Roads area in Virginia. On the "South Side" are Norfolk, Portsmouth, Virginia Beach, Ocean View, Cape Henry (Fort Story), Naval Operating Base and Norfolk Navy Yard in Portsmouth. On the "North Side" are Newport News with its huge shipyard, Hampton, Old Point Comfort, Langley Field, Fort Eustis and, further up the Peninsula, the Colonial National Park including Yorktown, where the Revolutionary War ended, Williamsburg, the restored colonial capital, and Jamestown, first white settlement in the U. S. Besides tourists attracted to these resorts and historic shrines, thousands will visit newly-inducted service men at Army and Navy posts in this area

increased consumption, increases beyond the heavy demands they are now handling for gasoline and fuel oil.

Virtually every oil marketer in the Norfolk-Portsmouth-Newport News area has increased his trucking facilities by adding more trucks or installing larger truck tanks, or both. Some fuel oil marketers have equipped their trucks with meters, pumps, automatic valves and nozzles, 150-foot hose and reels and other equipment to speed unloading and keep up with their customers' orders.

Several marine terminals and bulk plants have added more tankage, also installing new loading racks with faster pumps and meters. At least one company may build a new terminal soon.

One marketer, besides increasing size of tanks on his trucks, has installed larger tanks at his stations and dealer outlets so that they can make larger dumps. Another company has arranged with certain of its dealers and lessees, scattered at strategic points around the city, to take whatever gasoline its trucks have left so that the equipment always returns empty to the bulk plant.

Still another marketer in this area, who added to his bulk storage last summer, is now considering whether he will need more tanks this year. His fuel oil volume this past winter required the purchase of another truck which can soon be converted to gasoline service—but what will he do when the fuel oil season rolls around? He's waiting to see.

Another company's bulk plant was equipped with new truck loading rack and overhead equipment for unloading tank cars at start of fuel oil season. But gallonage increases, especially fuel oil, pushed the volume to more than twice as much as the bulk plant was ever designed to handle. Several times this plant would have run dry, were it not for keeping tank cars on the siding. Result has been a considerable increase in demurrage charges.

Even the smaller fuel oil dealers have felt the boom. Two dealers in Norfolk and one in Portsmouth each bought a new tank truck this year.

Population in Hampton Roads Area and Estimates of Future Increases As Compiled for Hampton Roads Regional Defense Council

	April, 1940, U. S. Census	Estimated Population At Present	Per Cent Gain	Estimated Population When Defense Program is in Full Swing	Per Cent Gain
On the South Side	305,229	360,000	18%	400,000	31%
On the North Side	93,353	125,000	34%	155,000	66%
TOTAL: Hampton Roads Area	398,582	485,000	22%	555,000	39%
Present estimated population over 1940 Census					86,418
Future estimated population increase over present estimate					70,000
Future estimated population gain over 1940 census					156,418

Fuel Oil Gains

Fuel oil gallonage increases in the Hampton Roads area ranging up to 100% and more this season were registered in the face of a mild winter as compared with record-breaking sub-zero temperatures last year. But further gains are in sight for the 1941-42 season, with thousands of oil burners being installed in housing projects.

A total of 6639 federally-built new

housing units, plus at least 5000 more privately-built homes, have been started in the Norfolk-Portsmouth-Newport News metropolitan area since the census in April 1940, according to Raymond B. Bottom, Newport News publisher and chairman of the Hampton Roads Regional Defense Council. Census showed 84,086 dwelling units in this area. Since then substantially all of the unoccupied units (2359) have been tenanted. This makes an increase of 13,998 dwelling units in less than a years. Major Bottom's figures were as of March 10. Since then hundreds of new privately-built homes have been started and several new housing projects—one for 500 units—have started.

Most of the oil heating units being installed in these new homes are of the circulating type with pot burner and carburetor. They burn No. 1 and No. 2 fuel oils. Negro slum-clearance housing projects are usually heated with coal.

Much of the housing construction is in groups of 250, 500 and even 1000 or more units. They include 4 and 5 room bungalows, side-by-side duplexes, two-story duplexes, groups of row houses (terraces) and apartment buildings of several units each. They sell for $2500-$3000 with down payment of $250-$300 and monthly payments as low as $18 or $20. Rents are from $18 up.

This provides a highly-concentrated heating oil market—but there is a headache attached to serving these customers.

Each housing unit has its own burner and tank. And many of the tanks hold only 50 gals., others have 110-gal. capacity. Comparatively few are of the 275-gal. size. Marketers generally have damned the government's "inefficiency" in installing such small capacity tanks.

Installing 110-gal. tanks at Navy's 1200-unit housing project on edge of Newport News. Each unit has an oil burner

Fuel oil tanks are generally installed on uprights beside the kitchen door. Some are located at rear of the lots, and some beside the front doorstep. There are no alleys in these housing projects. All service deliveries are made from the street. To bucket 50 gallons across the lawns and backyards (mostly just mud now at the homes which have been completed), was too hazardous. Marketers generally have installed 150-foot lengths of hose on their fuel oil trucks so that they can reach even the tanks at rear of the lots. Many trucks are equipped with meters which, when set to a given amount, automatically cut off when that amount has been pumped into the tank. Flow of oil is controlled at the hose nozzle. Sometimes it is possible to serve two or three customers without moving the truck.

Several marketers have the idea that if they can get the fuel oil contract for all the homes in a housing development, it would be a nice bit of business. But if each individual home is going to choose its own fuel oil supplier, then let the peddlers and commission agents have the business, say these marketers.

Some marketers charge half cent above tankwagon for dumps of less than 100 gals.; others for dumps of 50 gals. or less. Some marketers sell at tankwagon price regardless of quantity.

A promoter of one privately-built project is reported to have offered all the fuel oil business to one marketer, if he would sell at tankwagon and then give the promoter 0.5c a gallon to "pay for servicing the burners".

One marketer, faced with the prospect of an increasing number of small, odd-lot dumps this season installed meters and printers on his 8 fuel oil trucks. These instruments automatically record on the ticket the exact amount delivered. "It's saved us a thousand arguments this winter—especially with women, and they are the ones usually at home when fuel is delivered," this marketer commented.

Burners in these housing units usually use No. 1 or No. 2 fuel oil. One marketer sells a blend of kerosine and 5% of No. 2 fuel. A flexible line with meter runs from his No. 2 line to nozzle so that it is easy to blend the fuel while loading the truck at the rack.

Station Construction

Some marketers believe that the Hampton Roads area has "too many retail gasoline outlets," there have been relatively few large stations built in past few years. Several large stations—one a block long, fronting on four streets—are under construction now. More are planned, both by majors and local marketers. Private brand marketers are building several stations. One local marketer has started two huge stations, total cost

Many fuel oil marketers are equipping their trucks with 150-foot hose, reel and meter with automatic cut-off valve so that they can serve the new homes as completed and occupied. LEFT, a driver fills 110-gal. tank in rear of house. RIGHT, G. M. Cotton, Portsmouth fuel oil marketer, demonstrates how meter is set for amount to be delivered. Mr. Cotton recently added two more trucks

Consumers Company.
COAL - FUEL OIL - COKE
A Complete Fuel Service
Consumers Company.
COAL - FUEL OIL - COKE
A Complete Fuel Service

6000 gallon Heil Quality-Built Trailerized Train, comprising one 3000 gallon Semi-Trailerized unit and one 3000 gallon four-wheel Trailerized unit

"Mister, highway restrictions are no bar to *bigger payloads.* Heil *light-weight* Trailerized Tank Construction takes care of that!"

"Man, oh man — what real loads you can haul in Heil Trailerized Tanks!

"Know why? Well — without deviating from conventional tank shapes, Heil trailerized construction insures the lowest possible weight per gallon in keeping with all recognized safety regulations. It combines a frameless tank and running gear all in one.

"Elimination of the trailer frame provides unusually low mounting, lower center of gravity, increased stability and greater safety. And it stands to reason that with less dead-weight you can carry more gallonage and still keep within highway restrictions.

"Better get Heil recommendations on your next equipment order and benefit by the many additional features they provide to help you carry bigger payloads at less cost and with greater safety."

T-44

6200 gallon Heil Quality-Built Trailerized Tank

5500 gallon Heil Quality-Built Trailerized Tank

THE HEIL CO.

MILWAUKEE, WISCONSIN • HILLSIDE, NEW JERSEY

THE HEIL COMPANY, 3000 W. Montana St., Milwaukee, Wis.

☐ Please send me your new Heil Transportation Tank Catalog.
☐ Please send me the free Heil Quality News regularly.

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Tear out coupon and mail today for ★ New Heil Transportation Tank Catalog ★ Heil Quality News — Free monthly picture-news bulletin.

of which is rumored to be $60,000. Considerable revamping of existing outlets—new pumps, additional bays, lifts and other lubritorium equipment, new drives and buildings—is going on.

Corners near the new housing developments are sprouting stations; several will probably be located at the entrance to each of the larger projects. Companies are "playing them close to their vests" because some of the larger projects are just starting. New projects start with little fanfare, so marketers are kept on the jump to watch for good locations. Many housing projects are located at outskirts of the cities, making automobile transportation almost a necessity.

HIGHWAYS leading from the Hampton Roads area, especially Norfolk, are being combed by some marketers for outlets. They foresee a heavy volume of traffic this summer on roads leading to Army and Navy posts, beach resorts, historic shrines and defense projects. Shiny, new gasoline pumps of some companies are making their appearance in front of all sorts of establishments—grocery stores, hamburger stands, feed stores and similar outlets. On one road there are three outlets of one company within about 150 yards. In the cities also, tourists will have no need to walk far for gasoline. One intersection in Norfolk has a station on each of the four corners, with a fifth one adjoining and several more just down the street.

Despite the many retail outlets and the presence of a number of price-selling marketers, the prevailing posted retail price in Norfolk, Portsmouth and Newport News is at least 4c above tankwagon on housebrand, regular gasolines. Discounts of several cents to fleet owners and other commercial consumers are prevalent at some stations, but not many private car owners receive discounts, marketers said.

For years, stations near the Norfolk Navy Yard (which, incidentally, isn't in Norfolk, but across the river in Portsmouth) were plagued with "commissary" sales of gasoline on the naval reservation. Until a few years ago, such sales were free of the 5c state gasoline tax. A station run by the local post exchange was reported to limit its sales to enlisted men, but there was another station operated by a co-operative resturant which was said to sell to civilian employes at 3 or 4 cents below the retail price prevailing at stations outside the Yard. Story goes that some civilian workers, besides buying for themselves at bargain prices, would occasionally drive in their friends' cars into the Yard and fill up at the co-op station.

But the situation at the Navy Yard is reported to be clearing up. With nearly 20,000 civilian employes in the Yard now—normally there are only 7000—the Navy needs all the room it can get and doesn't want space cluttered with workers' cars. Arrangements are being made to fill in and cinder several lots for parking near the Yard. The Navy has arranged with a filling station operator to supervise the parking but limits his charge to $1.25 monthly per car. There will be space for 900 cars at one of these lots.

Even with a 4c margin and booming gallonage, nearly every marketer in the Hampton Roads area is having difficulty holding station lessees in the face of high wages paid in the shipyards and on defense construction projects.

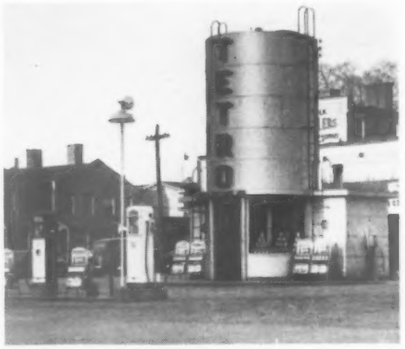
Suppliers, as in other defense areas where labor costs have jumped, are striving to improve merchandising efforts of their station men, especially in the sales of lubrication services and "plus profit" items, so as to increase station revenue.

One dealer has outfitted his wife with uniform cap and coat. She pumps gasoline, wipes windshields and salutes customers as smartly as any man.

Some oil companies have had as many as 4 or 5 stations closed at one time because they couldn't find lessees. They advertised in the newspapers and posted signs in the stations, but to no avail.

ONE company, though, makes a policy of never letting any of its lessee stations close—even for a day. If the lessee quits suddenly, this company puts in a salaried man immediately. Recently, this marketer pulled a driver off one of its trucks and put him in a station. Now, the erstwhile driver is doing so well that he wants to keep on as a lessee operator. And, as another marketer commented, why shouldn't a truck driver-salesman make good as a station operator? Doesn't he see all types of lessees, learn from the good operators and see an object lesson in the poor operators? Wouldn't a driver-salesman be

Unusual Stations



"Tank" at this unique station building in Norfolk is used for storage of merchandise

A real tank car makes an ornamental entrance at this new station in Newport News, Va. Doorway was cut through the car, with building beyond

PORTSMOUTH, VA.—Left, a private-brand marketer builds a new outlet. Right, a major company rebuilds at a good location

TAKE A TIP FROM YOUR CUSTOMERS...

It's just sound business to sell the products that please your customers most. And the best way to discover what gasoline makes them the happiest is to keep your ears open when your Ethyl customers start talking. Not only will their enthusiasm impress you, but you'll find out why more and more car owners are swinging over to Ethyl every day. For instance, don't be surprised when you hear a customer say:

Car dealers and service men know that Ethyl brings out the best performance in their cars. They know that Ethyl permits setting the ignition timing for *more power* without "knock" or "ping." That's why so many of them are advising their customers to use Ethyl—are helping *you* to sell your best gasoline. Ethyl Gasoline Corporation, Chrysler Building, New York City.

ETHYL
ETHYL GASOLINE CORPORATION

SELL FROM THE PUMP WITH THE ETHYL EMBLEM—

AN INDEPENDENT MARKETER is building this block-long station in Norfolk. It will cover entire block and have frontage on four streets. This, and another large station being built by the same marketer in South Norfolk, reportedly will cost around $60,000 including all equipment

a better bet than some outsider just entering the gasoline business?

Defense Council Gives Data

Data on the size of the defense boom, prepared by Hampton Roads Regional Defense Council, of which Major Bottom, Newport News, is chairman, shows:

SOUTH SIDE (Norfolk, Portsmouth, Virginia Beach, etc.)—A total of 35,000 military and naval personnel stationed at posts on the South Side, which will increase substantially soon.

A total of 30,000 civilian workers are now employed directly on defense activities, with another 10,000 to be added within 6 months. In addition, another 20,000 are employed on the South Side in work incident to defense activities.

Defense appropriations and contracts, including $325,000,000 at Norfolk Navy Yard, total $370,564,505 (as of March 10).

NORTH SIDE (Newport News and lower Peninsula)—A total of 40,000 military and naval personnel are to be stationed at posts in the North Side area by June 1.

A total of 28,000 civilian workers are now employed directly on defense activities in the North Side area; this number will be increased materially when Newport News shipyard adds men as housing facilities are available and more when new ships ways are completed.

Defense appropriations and contracts, including $548,415,667 in contracts with Newport News shipyard, total $573,683,831 (as of March 10).

Further details on the "oily" angle of defense boom in Hampton Roads area are given for each city below.

Because of greatly increased traffic on highways and expansion of Army units in this area, Hampton Roads defense council is asking Washington to improve key roads in this area. A single regiment of Coast Artillery troops (there are 8 regiments in the Hampton Roads area) with its trucks, prime movers and mobile gun units will occupy space of about 4 miles on the road, it was pointed out. At other Army posts, are thousands of trucks, rolling kitchens, scout cars and other mobile equipment.

* * *

Newport News Booms

Newport News, unofficial capital city, of the Virginia Pennisula and the "north side" of Hampton Roads, shows more earmarks of a boom town than either Norfolk or Portsmouth.

Crowds jam Newport News streets until late hours. Lines of people wait patiently in front of the movie theaters. Restaurants are so crowded people walk for blocks before they find one with an empty table. Transients stand three deep at the hotel desk, waiting for promise of a room—even without bath. Traffic became so congested that traffic lights were installed at principal corners and "no left turn" signs posted at other intersections on main streets.

"Too much traffic" is the complaint from some downtown station operators. One-way streets and bumper-to-bumper lines of cars keep their customers from the station drives in rush hours.

And all this in a town that a year ago had only one all-night restaurant and the streets echoed to footfalls soon after dark.

Some stations which have been closed for years are reopening. Remodeling and improvements are going on at others. New construction is mostly in the outskirts, near the new housing projects going up. Stations on the edge of the city where traffic is not so dense are doubling their gallonages while downtown operators are held to modest increases.

One of the most fortunate of the new stations is one on the Richmond road where it intersects with the approach to the four-miles-long James River Bridge, a main north-south

Newport News shipyards where Uncle Sam has contracted for $500,000,000 in battleships, aircraft carriers, cruisers and other warships is expanding its facilities to handle this huge order. Picture on left shows construction workers cars parked. On right, is one of parking lots for shipyard workers, many of whom drive in from outlying points

One of the intermediate models in the great line of Mack trucks

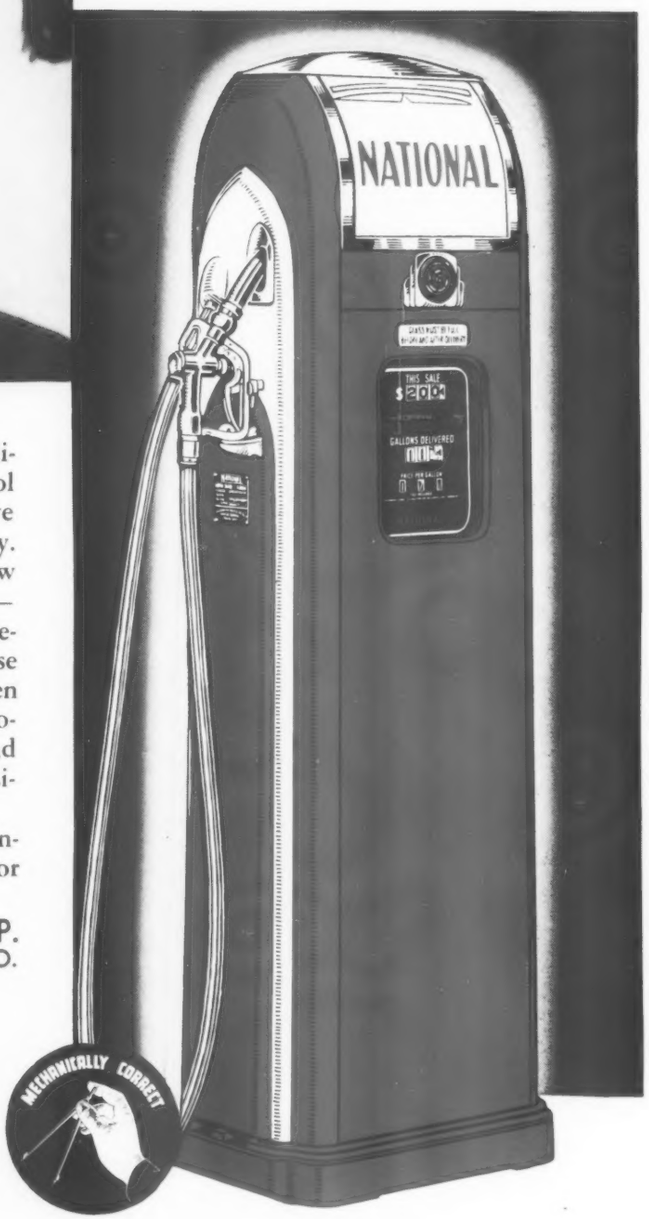
MACK TRUCKS

One to 45 Tons and all "Heavy Duty". Gasoline or Diesel.

Chassis prices now start at $625.

FOR 1941

MORE IMPROVEMENTS THAN MEET THE EYE!



SMART—yes! . . . STYLISH—yes! And, in addition to her streamlined beauty, this business school graduate and all new 1941 National Pumps give you accuracy, speed, quietness and dependability.

For more than a year National has had new 1941 "test pumps" located in service stations—*without a failure or a complaint of any kind!* Recent reports have been high in their praise of these pump improvements. Test meters have proven more impervious to impurities in water and gasoline, have shown more "driving power". And their "positive stop stroke" ensures their "positive accuracy".

If you want new 1941 improvements, look inside the door of a new 1941 National. Write for details and prices today.

NATIONAL PUMPS CORP.
3251 Beekman St. Cincinnati, O.

New **NATIONAL**
SERIES - 38

Computapex . . . Printapex . . . Hose Extension
Wide-Arc Island Liter . . . 99 Gallon Register
Hi-Delivery . . . 20 Gallon Dual Meter

artery. This marketer had counted on a lot of tourist trade, but little neighborhood business. Along comes the Navy and locates a 1200-unit housing project right across the road which, he now estimates, will include about 1000 family cars. And there is no other station for perhaps a half mile in either direction. (This marketer operates several other stations and is planning to build another soon.)

Each of the homes in this 1200-unit development has an oil burner and a 110-gal. tank at the kitchen door. None of the homes is completed yet. They are two-story duplexes. These units are being built by the Navy to house shipyard workers. Bids were recently asked on "approximately 60,000 gals. of both No. 1 and No. 2 fuel oil to be delivered 50 gals. to each of 1200 tanks."

Newport News Shipbuilding and Dry Dock Co., a privately-owned company, has government contracts totaling well over $500,000,000 for construction of battleships, aircraft carriers, cruisers and cargo ships. Additional facilities are being built and more employes will be taken on just as fast as housing can be provided. Employment in the shipyard is now nearing 18,000.

Shipbuilding program of the Navy will last at least 5 or 6 years, so the Newport News defense boom appears more permanent than most.

NEWPORT NEWS' population by the 1940 census was 37,067. Now it is 45,000, according to estimate of Major Bottom, local newspaper publisher. But social workers and others who have seen men sleeping 4 and 5 in a room, and 3 and 4 families in a small house, say that this estimate is too conservative, that the total is nearer 60,000 now.

Besides the shipyard employment and thousands of workers on the housing projects, there are many thousands more working on Army and Navy construction near Newport News — at Langley Field, Fort Eustis, Fort Monroe and Yorktown Naval Mine and Fuel Depots.

Workers are commuting by automobile from Richmond to Fort Eustis, a roundtrip of about 120 miles daily. Story is told of one worker living on the other side of York river who has to cross a ferry and drive 50 miles to work. Because there is always a line of cars waiting to cross, this worker must get up at 4 AM. Returning in the evening he has to wait for the ferry to make several trips before it is his turn to cross. He gets home after dark.

Gasoline gallonage gain for the Newport News area has run as high as 44% for one of the largest marketers —higher for some marketers with smaller volume.

Some marketers report a 100% gain in fuel oil sales over 1940. And it isn't due to the government housing projects because only a few units had been completed by April 1. It seems that there has been a big gain in the use of the circulating-type of oil burner in the past several years. One Newport News store this year sold over 500 of these burners, and not to the housing projects.

One company is reported to have doubled its sales of gasoline and fuel oil so far this year.

Another marketer—call him Company A—"guessed" that his business was about 50% ahead of last year. When he got out his books and figured his actual cash volume for March as compared with that of March, 1940, he found it was up 96% for gasoline and fuel oil. And he hasn't been seeking new business but simply trying to take care of efficiently what he already had. Even with his fuel oil equipment converted to gasoline service, this marketer finds need for another tank truck and is ordering one within the next week or two, he said.

Company B has increased tank capacities of its four trucks from 800 to 1200 gals. each and is also revamping several stations, adding lubritoriums and improving equipment. Larger tanks are being installed at stations to take larger dumps.

Company C recently added several new tanks at its bulk plant, remodeled some outlets and constructed a new station.

Company D is revamping one station and adding lubritorium. Added tankage last summer and "hopes we won't have to again this year, but waiting to see." Fuel oil business up sharply, another truck added.

Company E opened three outlets in first week of April. One was a newly-built station, another was an outlet closed for several years (re-opened with new pumps, drive and other new equipment), while the third was a company station re-opened with a new lessee.

Several other companies have completed new stations or revamped existing locations on north side of Hampton Roads in the past six months or so.

There are five trackside stations in Newport News, one of them a new one nearing completion. Four of these stations are operated by trackside "chains"; the other is locally owned.

Most marketers have marine terminals and get their supplies by boat from ocean terminals at Norfolk and Portsmouth on other side of Hampton Roads.

New Stations Built In Newport News

New outlet of J. W. Hornsby, jobber, on downtown thoroughfare

Curtis Oil Co. is remodeling this station and converting building into company headquarters

Hampton Roads Oil Corp. recently completed this new station on city's outskirts

New outlet just opened by The Texas Co.

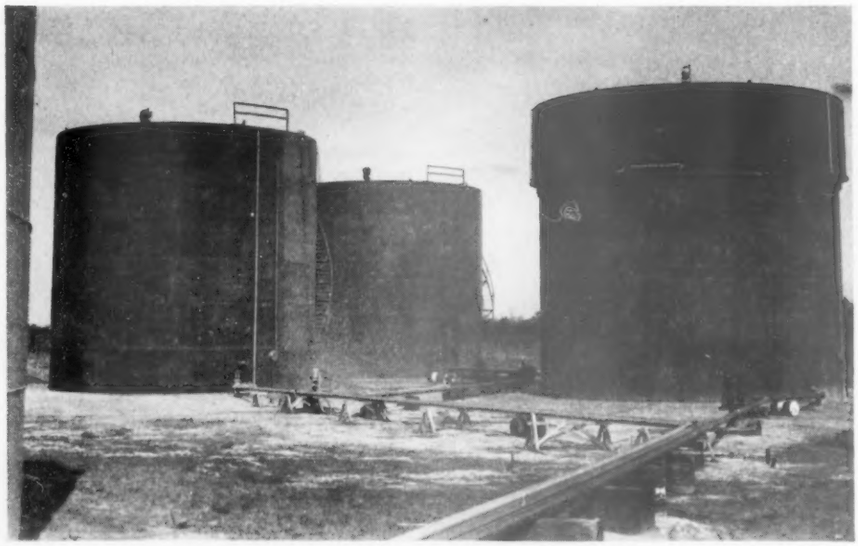
Portsmouth Gains

Portsmouth, which includes within its limits the Navy Yard where a 35,000-ton battleship, the Alabama, is nearing completion and many smaller warships are building, doesn't get to have the yard's name because there is a Portsmouth Navy Yard—in New Hampshire.

The Norfolk Navy Yard—in Portsmouth—was employing 18,223 civilians on March 30 at a weekly wage of $756,285. Last year, there were about 9000 employed in the Yard. New facilities are being built which will increase shipbuilding capacity.

Population of Portsmouth, across the Elizabeth River from Norfolk, was 50,745 in April, 1940. Today it is estimated at over 60,000.

There are four housing projects in



THREE NEW 10,000-BBL. TANKS being sand-blasted for painting at Norfolk terminal of Colonial Oil Co., Pure Oil distributor. Tank on right has "breather" roof to prevent evaporation losses in gasoline storage, which is connected with another gasoline tank in background. The third new tank on left is for kerosine

Portsmouth, totaling 1225 family units and costing $4,200,330, according to Hampton Roads defense council's survey early in March. Simonsdale project, with 150 units building, may grow eventually to 2000 homes. Several others are planned and additional developments are under way outside the city limits. Survey is now being made at Naval Ammunition Depot for a 500-unit project. Virtually all of these homes are equipped with oil burners.

Several new stations are planned in Portsmouth. One marketer is planning to build a pre-fabricated steel station. Others are revamping existing outlets at good locations.

Norfolk is Near 200,000

Norfolk had a population of 144,332 by the April, 1940 census. Now, it is "conservatively estimated" at 175,000-180,000 by local chamber of commerce officials, to reach 200,000 by July 1. Other estimates place figure at 200,000 or more now. About 250 families are entering Norfolk each month. Approximately 80% of the newcomers get defense jobs but much of the increased employment comes from new retail outlets and expanded trade.

Last year 1,025,000 tourists visited the Norfolk area, including Portsmouth, Virginia Beach and Ocean View, according to the Norfolk Advertising Board. This year the "conservative estimate" is 1,400,000, of which 80% will come by automobile.

Gasoline gallonage gains for Norfolk marketers in January and February of this year were up as much as 90% with most showing increases of 30% or better. Fuel oil sales for some marketers ran as much as 100% above 1940.

Department store sales in Norfolk in January were 49% above the same month of 1940, compared with a 17% gain for the Federal Reserve District containing Norfolk. February sales were up 44% as against 14% for the district.

There are at least four large-scale housing projects under way now in Norfolk; three contain 1042 units, 500 units and 210 units, respectively, each unit having its own oil burner and tank. The fourth project is a slum-clearance development with 430 units which probably will use coal for heating plant. In addition, there are probably 3000 privately-constructed homes in smaller groups which have been started in past year or will soon.

Stations are building or planned near the new housing projects. One marketer is constructing two stations costing approximately $30,000 each. There is also a considerable amount of improvement being done at old locations.

Norfolk has nine ocean terminals, each with capacity of many millions of gallons. They handle tanker loads direct from the Gulf. From these terminals, products are shipped down the inland waterway to eastern North Carolina and up the many rivers which finger inland from Hampton Roads.

COLONIAL Oil Co., marketing Pure Oil products in Tidewater Virginia and eastern North Carolina, is completing the addition of three 10,000 bbl. tanks (1,260,000 gals.) at its ocean terminal in Norfolk, bringing total capacity up to 160,000 bbls. (6,720,000 gals.). One of the tanks is for kerosine, and the other two for third grade and Ethyl gasolines, respectively. The two new gasoline tanks are connected to a "breather" on one to reduce evaporation losses. Installation includes 3 booster pumps and 2800 feet of 6-inch pipe in 3 lines.

Also newly-installed is a loading rack connected directly with large storage tanks and equipped with three 3-inch meters; two with capacity of 300 gallons per minute, and the other, 200 g.p.m. With these meters, this plant can load trucks directly from 55,000-bbl. tanks even while a tanker is discharging into these tanks. Readings are taken from meters before and after tanker unloads, along with readings on shore tanks. In this way, the plant superintendent can determine exactly how many gallons have been discharged by the tanker. Were it not for the meter system, the amount discharged would be determined by the tanker's hullage markings.

NEW LOADING RACK constructed at Colonial Oil Co.'s terminal is equipped with three large meters so that trucks are loaded directly from the storage tanks. This marketer has recently increased size of tanks on 10 trucks and added a new truck

What's the Use of Chopping Up Your Business?

EVER WONDER what some of your customers use for motor oil? Ever suspect that they might be getting gas from you — but going somewhere else for oil?

When you don't carry an emblem Pennsylvania Motor Oil, you are chopping customers in half. Stop this drain on sales and profits by featuring the oil most motorists prefer — an emblem-protected Pennsylvania Motor Oil. Ask a Pennsylvania Grade Crude Oil Association man or write to us direct.

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Oil City ***Pennsylvania***

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION

Car Dealers Put On Drive For Change-Over Business

SPRING Change-Over profits in 1941 will be the greatest in the history of automotive service selling, but oil marketers' stations are faced with formidable competition from car dealers for this service profit.

Looking to the future when sales of new cars may be restricted because of the defense effort, car dealers and manufacturers are making an intensive drive to sell services. Their efforts in this direction are based on the sound reasoning that restriction of new car sales will bring heavily increased sales of used cars—which require more frequent, thorough, servicing—and that in a real war pinch, efforts of the automotive industry would be turned, not to the manufacture of new cars, but to the maintenance in operating condition of those cars already on the road. This condition now exists in England, where maintaining present equipment is the sole objective of the automotive trade.

Here in the U. S., fully aware of what the future may hold, car dealers are laying down a real barrage and are attacking the sales of servicing from all angles. Following 4 points sum up what car dealers are doing to increase Change-Over profits this spring, as shown by a survey in Cleveland:

1—Car dealers are utilizing Change-Over promotional plans. Some are tied in with programs worked out by car manufacturers. Car owner magazines, published by manufacturers, feature articles on why the Change-Over is necessary and recommend having this work done by the car dealer.

2—Car dealers' Change-Over programs are mainly based on Lubrication. Many, however, also feature motor-tune-up.

3—Nearly all are featuring special groups of lubrication or mechanical services at flat prices. Very few of these flat prices, however, represent cut prices. They are merely "packages" of various services appropriate for the Spring Change-Over.

4—All are using active customer follow-up programs. Car dealers interviewed were unanimous in reporting that the foundation of their Spring Change-Over programs is their customer follow-up. At least 3 reported they employ the full time services of one person to take care of customer solicitation. Another reported that he had 2 follow-up systems in operation.

In order to study and report just what type competition marketers are meeting from the car dealers' service departments, NATIONAL PETROLEUM NEWS has just made a survey of 20 representative service shops in Cleveland ranging from those of Ford to Cadillac dealers.

These service departments are not going into the Spring season operating on a hit-or-miss "shall I change your oil" basis, but are pitching their efforts at educating the motorist to the need and value of the Spring change of lubricants.

"Much of the missionary work has already been done on this, and the average motorist is aware of the necessity of changing from winter to summer lubricants", reports the service manager of one large dealer, "but", he added, "we've got to keep after them to get them to come in".

Dealers Use Own Programs

While car dealers' efforts at getting cars into their service departments for Spring service are augmented by articles appearing in owners magazines published by the car manufacturers, and while manufacturers have programs of Change-Over solication which they recommend, many dealers have also incorporated their own ideas into this campaign.

Colorful folders and letters emphasizing the need for changing from winter to summer lubricants are sent out by dealers, in their fight to swing lubrication work to their service shops.

Commenting on the success of its dealers over the country in selling Spring Change-Over services to increase profits to the dealership, the zone factory head of one medium priced car said: "Even if a dealer cannot afford an elaborate program for pushing the Spring change, he must send out reminder cards to his customers to get this business." This service head added that he has surveys which prove that a simple handwritten penny post card brought nearly as great a return as the most elaborate mailing piece. He was making the point that even though car owners know of the need for the change, they must be reminded to have it done. "To get spring, or any other service profit, the dealer must go after it, it will not come to him. All of them", he added, "are going after it".

Lubrication is Heart of Shop

Almost without exception, service managers of dealers told NPN that they consider the lubrication department the "heart" of their service shops. "Even if we gave lubrication service away, we would still be money ahead by getting cars into the service department where we have a chance to spot needed labor sales, or sell accessories," commented the service head of a large Chrysler dealer.

But these dealers are not giving their lubrication services away. In fact, as a general rule the prices charged for individual services are higher then those charged by the average service station for the same work.

Following is a table of prices charged by this group of car dealers for services which are part of the Spring Change-Over campaign, and which can be performed by the average oil station

It will be seen from the above table of charges made by car dealers that they are getting a better return than the average oil marketers' service station for most services.

Only 3 of the 17 dealers, whose prices are listed, charged 75c—the

Service Charges of Car Dealers

	Dealer A	Dealer B	Dealer C	Dealer D	Dealer E	Dealer F	Dealer G	Dealer H	Dealer I	Dealer J	Dealer K	Dealer L	Dealer M	Dealer N	Dealer O	Dealer P	Dealer Q
Chassis Lubrication	$0.75	1.00	1.00	1.00	1.00	1.25	1.00	1.00	$1.00	1.00	1.00	1.00	1.25	.75	1.00	1.00	.75
Flush Crankcase	1.00	...	1.00	...	1.50	...	1.80	1.00	1.00	...	...	...	1.00	...	1.00	1.00	1.00
Flush Transmission	.50	.75	.65	.50	.75	1.00	.75	.75	.75	1.00	.50	.50	.50	.50	.75	...	.50
Flush Differential	.50	.75	.65	.50	.75	1.00	.75	.75	.75	1.00	.50	.50	.50	.50	.75	...	.50
Clean Air Filter	.50	.75	.50	.50	.50	1.00	.50	.50	.50	.50	.50	.50	.50	.25	.45	.50	.50
Wheel Bearing Pack	1.00	1.35	1.35	1.40	1.00	1.15	1.35	1.35	1.00	1.00	1.65	1.35	1.15	1.35	1.15	1.25	1.00
Brake Fluid	.35	.50	.35	.35	.25	1.10	...	.25	.25	.25	.35	...	...	.35	...	...	.35

Note: Some dealers provide brake fluid only in connection with brake service. Some do not flush crankcases; several vigorously oppose the flushing of crankcase with power equipment.

America's only AERO-ENGINEERED Motor Trucks

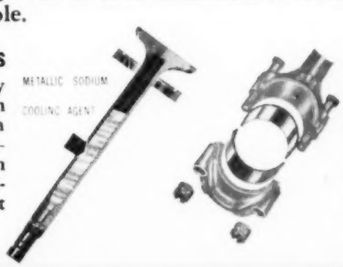
The National Defense Program has made all America conscious of how tremendously the power output of modern aircraft engines has been increased. Engines no larger, and in most cases much lighter, than those of just a year or two ago, have been "stepped up" to unbelievable heights of efficiency.

White set out, more than three years ago, to apply the same advanced engineering principles to motor trucks . . . using many of the same new and stronger metals and alloys that have made modern aviation's progress possible.

The result has been a complete line of White Super Power Trucks . . . trucks so advanced in performance, fuel economy and maintenance saving that they have proved themselves able to earn $1200 and more per truck per year in some of the country's leading truck fleets.

Find out today what an *Aero-Engineered* White Super Power Truck can do in producing extra money-earning miles for you. Phone your local White Branch or Dealer for a Demonstration or write THE WHITE MOTOR CO., Cleveland, O.

SODIUM-COOLED VALVES
—Internally cooled by means of Metallic Sodium —a pure metal which turns to liquid at 210°.— (Standard in all medium and heavy models; available in light at slight extra cost.)



INDIUM TREATED BEARINGS
—Aviation-type copper lead, impregnated as in high power output aviation engines — with Indium. Prevents deterioration due to acid condition in the oil.

White

FOR 40 YEARS THE GREATEST NAME IN TRUCKS

general standard price at service stations—for a chassis lubrication job. The greater majority—12—charged $1; while 2 dealers charge $1.25 for this work.

Flushing transmission and differentials brings between 50c and $1 each at car dealers, while the average service station charges 25c for this service. The same is true for cleaning air filters, although one dealer charges 25c, the usual price at stations.

Only 5 of the 17 dealers' shops charged $1 for packing front wheel bearings. The rest of the dealers charged anywhere from $1.15 to $1.65 for this service. While as a general rule the higher prices for services noted on the above table were reported by car dealers servicing the larger cars—Cadillac and Buick—the top price for a wheel bearing job, $1.65, was reported by a Chevrolet dealer's service department.

Flushing radiators, another important part of the Spring Change-Over program, is not listed above. Some dealers have reverse flushing equipment, and for this service charge anywhere from $2.50 to $4. Others merely flush the radiator with clear water, making a nominal charge of between 25 or 50c, plus the cost of cleaner, or rust inhibitor, if used. Sales price of these cleaners vary widely, from 50c to over $1 each.

Sell Groups of Services

Car dealer service managers report that offering groups of services at flat prices—even though they do not represent a saving to the motorist over the cost of this work if done individually—will result in higher cash sale to each customer.

"It means only one selling job when we have our various services grouped in a 'package' ", commented the service manager for a large Ford agency. Buick and Plymouth service managers echoed this statement, both agreeing that it is easier to sell a group of services at a flat price than to get the customer to buy these services separately. "Service packages" also represent savings to the car owner. In their direct mail advertising, the dealers point out this fact.

One Oldsmobile dealer's Spring special includes services having a $9.60 value at the dealer's separate prices, for a flat price of $6.80. Following services and materials are included in this offer:

Oil Change, flush crankcase
Transmission change and flush
Differential change and flush
Chassis Lubrication
Front wheels packed
Radiator flushed with water

Prices generally charged in the average service station for these services, however, indicate that the flat price of $6.80 is not an actual saving to the Oldsmobile owner based on prices at oil marketers' stations. At average service station prices, these services would sell for about $6.55, broken down as follows:

Oil change (5 qts.)	$1.55
Flush crankcase	1.00
Gear lubricants (5 lbs.)	1.25
Flush gear housings	.50
Radiator flush	.50
Front wheel pack	1.00
Chassis lubrication	.75
TOTAL	$6.55

Many car dealers, however, offer services which the average service station is not equipped to render. Five dealers included motor-tune-up in their Change-Over campaigns at flat prices ranging from $2.50 to $3.50. This includes checking and setting the timing, the generator, automatic choke, spark plugs, and the distributor; cleaning and adjusting the carburetor, and other services aimed at increasing the dealer's profit by selling equipment, accessories, or spotting labor sales. Many of these tune-up services included checking the battery, fan belt, windshield wipers, and brakes.

While the majority of dealers reached by NPN offered flat priced groups of services, the factory service head of a medium priced car, however, states that his company cautions that it may result in competitors using these flat prices to point out to prospective customers how much more cheaply the work may be done in their shops or stations.

Stagger Work to Increase Sales

Many oil marketers' stations, when the Spring Change-Over gets into full swing, will at times wish they had 10 lifts and 10 lube men to take care of the peaks of business. Car dealers, however, report that they have been able to overcome this problem.

Service managers said that the average car owner, if intelligently approached, can be sold on waiting for service; either waiting in the shop, or returning later, or leaving the car to be delivered by the dealer.

Service departments of car dealers impress upon the customer that it takes time to do good work. The following incident which took place during an interview with the service manager of a Buick dealer is a good illustration of how dealers impress upon customers the fact that time is needed to provide proper servicing.

Driving down the ramp into the service department in a 1940 Buick, a customer called to the service manager asking, "Fred, say how long will it take to get this greased?" The service manager replied: "Oh, at least a couple of hours". The customer complainingly asked, "What! 2 hours?" In a jocular tone the service manager then said, "Well, I guess it would take us only a few minutes to spread a little grease on the fittings where you could see it, but it will take at least a couple of hours to get it up on the lift where we can do a real job". The customer left his car.

The service manager pointed out to NPN's staff writer that it would have taken only 20 to 30 minutes to have done the work, but that there were other cars promised for certain times that were ahead of this customer, and that they made it a policy to have cars ready when promised. He added that more ill-will would have been created among his other customers than would have been gained by trying to squeeze that lube job into an already tight schedule of work.

One Dodge service man commenting on this question, said: "Oh, we occasionally get someone in here that wants his work done RIGHT NOW, but we have little difficulty explaining to the rest of our customers that it will take some time to have this work done properly, and we find the majority will leave their cars in the shop". In this manner, he pointed out, the dealer can keep his lubrication and other equipment going at all times, and keep the men working all the time they are on the job.

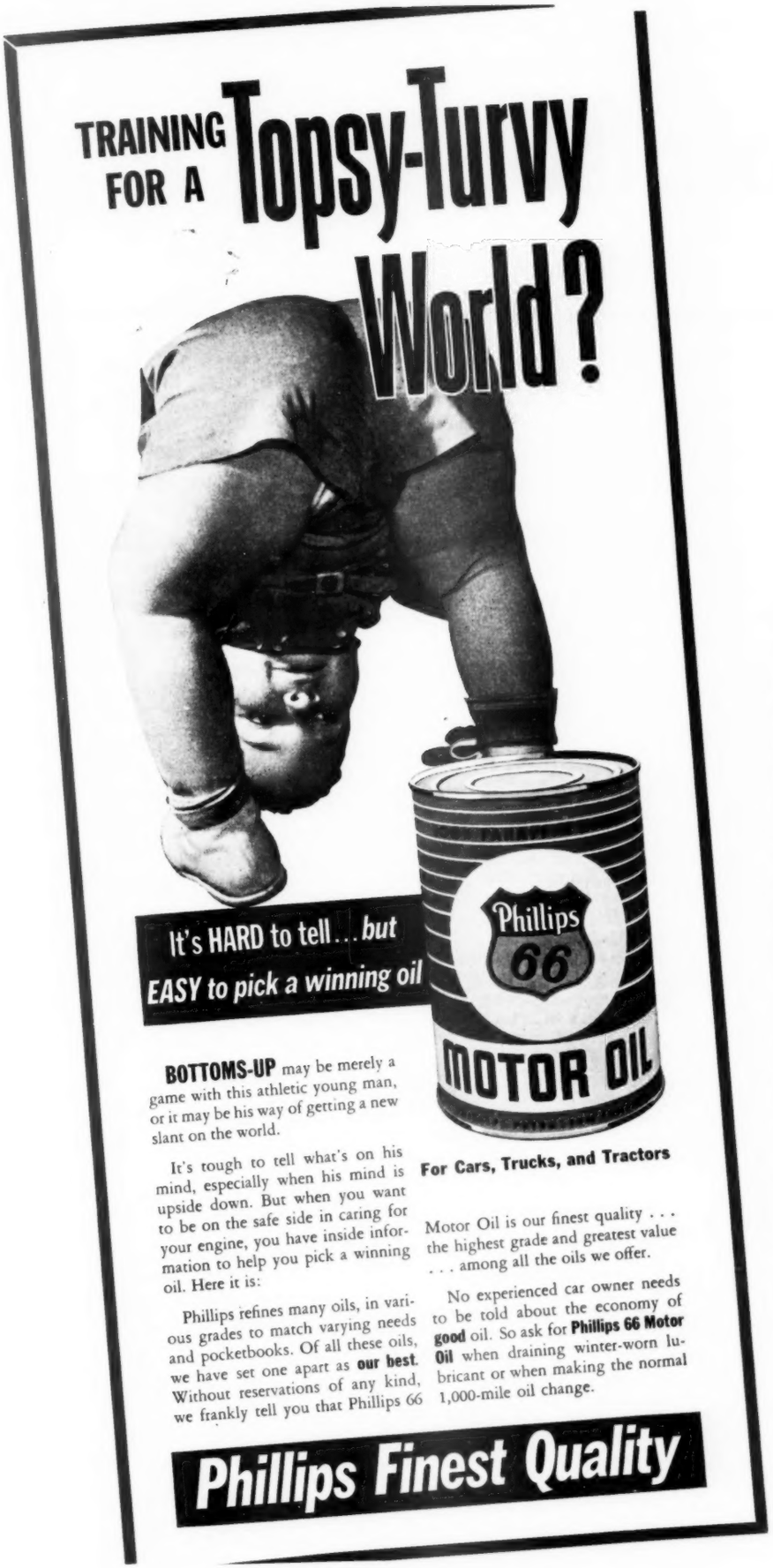
Service manager of a Buick agency also added that it would be impossible for the dealer to have sufficient equipment to handle the service peaks that build up during the Change-Over periods, and that they encounter little difficulty explaining this to their customers in asking them to wait.

Car dealers in respect to getting car owners to wait for service have one advantage over the service station, in that most of them have pick-up-and-delivery service. When a customer leaves his car for service and he cannot wait, it can be delivered to him later. Also, in their follow-up, many ask the car owner if they cannot call for the car, service it, and deliver it back to him the same day.

Modern Service Departments

Physical assets which car dealers carry into the fight for service profits during the Spring Change-Over also represent competition to the oil marketers' stations for the car owners service dollar.

The average car dealer's shop features modern equipment accentuated by colorful back drops; attractive, departmentalized service bays; clean uniformed attendants with a friendly and intelligent sales approach—all emphasizing the ability of the department to competently provide all the service needs of the motorist.


TRAINING FOR A Topsy-Turvy World?
It's HARD to tell... but EASY to pick a winning oil
Phillips 66
MOTOR OIL
BOTTOMS-UP may be merely a game with this athletic young man, or it may be his way of getting a new slant on the world.
It's tough to tell what's on his mind, especially when his mind is upside down. But when you want to be on the safe side in caring for your engine, you have inside information to help you pick a winning oil. Here it is:
Phillips refines many oils, in various grades to match varying needs and pocketbooks. Of all these oils, we have set one apart as our best. Without reservations of any kind, we frankly tell you that Phillips 66 Motor Oil is our finest quality . . . the highest grade and greatest value . . . among all the oils we offer.
For Cars, Trucks, and Tractors
No experienced car owner needs to be told about the economy of good oil. So ask for Phillips 66 Motor Oil when draining winter-worn lubricant or when making the normal 1,000-mile oil change.
Phillips Finest Quality

←

Typical of PHILLIPS PETROLEUM CO. advertising to build car-owner acceptance of Phillips 66 Motor Oil is this striking ad now appearing in large space in newspapers throughout the Phillips marketing area.

MERCHANDISING

This is a readers' forum on merchandising of petroleum products, automotive accessories and allied lines. Let us have your ideas on how to improve selling at stations. Address: Merchandising Editor, NATIONAL PETROLEUM NEWS.

Car Dealers Better Merchandisers?

Car dealers and oil marketers are perhaps the friendliest competitors in the entire automotive field. The "Home Oil Company" and the "Home Car Dealer" are constantly busy thinking up ways to outdo each other in oil, lubrication, wash and accessory business, yet they remain friends. Each looks on the other as a desirable piece of business; "Home Oil" sells the "Home Car" oil, grease and gasoline; "Home Car" sells "Home Oil" cars and perhaps trucks.

Some marketers are frank to admit that some car dealers are doing a better job of getting lubrication business than the average station. Different conclusions as to why this is the case —if it is true—are reached. One marketer will blame it on the "free service" plan where several grease jobs are given for nothing when a new car is bought. Another marketer thinks it is due to better training of the lubrication men.

Typical of how marketers look on this problem is a letter we received from the Sam Schneider Oil Co. of Hutchinson, Kans. They write:

"Our biggest competition and getting larger is the automotive dealer. This goes for operations in cities of several thousand population and over. We sell oil to some of these dealers, and they inform us that they are maintaining up to 75% of their car sale customers as steady wash and lubrication customers. However, this is an extreme case, although a number do run 40% to 50%, which leaves the oil companies competing for the balance. The trade they retain is without a doubt the 'cream of the crop.' In other words, customers who don't mind spending a little extra to get the best.

"The car dealer has the jump on the service station operator in several ways; first, in jobs, providing the customer get his oil change there. Second, factory trained lubrication men who they claim know more about this particular car than the service station man who monkeys with all of them. We take this 'factory trained man' with a grain of salt, as many of these men have been employed by us and other service stations and went directly to the dealer. To my recollection, they have never been out of the state. Third, car manufacturers are adding new types of transmissions, clutches, etc., which must be serviced by the car dealer. The lubrication guides issued by oil companies admit this. If a few more 'car dealers must service' points are added, what will we tell the customer? Fourth, some dealers are guaranteeing their cars up to 30,000 miles, and it has just been reported one major car concern is coming out with a 12 month guarantee.

"We have one bright spot in our favor against this argument I just related. The major companies and many independents are adding vast lubrication rooms to most of their stations. Therefore, more business is in view."

Larger Lubritoriums

There are a lot of angles to this car dealer competition. Perhaps Schneider Oil Co. hit the nail on the head when it said that larger lubrication rooms is the answer. This, plus as good, or better, equipment as is usually found in car dealer's lubrication department, together with more advertising by marketers as to how well trained their station men are, would seem to be the answer.

Perhaps other NPN readers have different ideas on the subject. We know there are many who have licked this competition. Other readers would like to know how they did it.

Oil Ratio Improved With Modernization

It would seem that the Lorner Petroleum Corp. of Springfield, Mass., found that the answer to the question of getting more lubrication jobs and selling more grease was to improve their stations' appearance and stress quality.

That company, in a letter to NPN telling about their last year's operations wrote:

". . . . it has been our policy in the past year to improve our stations' appearance and service, and to stress the quality of our lubrication jobs. While some dealers have not co-operated 100%, our oil proportion has gone from 1 gal. to 82 of gasoline in 1939 to 1 to 65 in 1940—and the grease sales from 1 to 128 to 1 to 101 gallons of gasoline."

Are Oil Salesmen Growing Extinct?

We wouldn't want to get oil salesmen in bad, nor do we want to expose marketers to a lot of red faced oil company representatives. But here is something!

A marketer in Texas, selling over 1,000,000 gals. of gasoline a year and who has been in business for 2 years, tells us that in all that time a salesman has not called on him from another lube refiner.

But that's not all: A Wisconsin marketer selling close to 1,500,000 gals. a year wrote us in November that the last call he had from a refinery salesman was early last year—1940.

But wait: A Florida distributor, selling many millions a year, tells us he doesn't remember when a refinery salesman called on him.

And an Indiana marketer writes us: About 6 or 7 salesmen have called in the past 6 or 7 months; 2 from companies we have been buying from the past 12 years, one from a major oil company whose 'gas' we used to sell and 2 small compounders."

Remember Way Back When—

One of the most common selling terms was "A quart of old oil added to 4 quarts of new oil makes 5 quarts of old oil".

That, and "oil is cheaper than metal" sold many a crankcase drain.

Come to think of it, it might still work.

Salesman or Attendant?

W. G. Sinn of the Crest Oil Co., Cincinnati, raises an interesting point. Writes Mr. Sinn:

"We find that referring to service station attendants as service station salesmen is bad psychology as far as the customer is concerned. In our talks with our employees we of course refer to them as salesmen, but as the

HOLD THAT PEN!

Before you sign your 1941 contract, look over your Cities Service salesman's attractive proposition

"Haste makes waste" in opportunities as well as in actions. So why not give yourself a break and listen to *all* the 1941 stories before you commit yourself for the year? Your Cities Service representative, for example, has a story worth hearing—a sales plan from which many another clear-headed, far-sighted station operator has profited richly.

Keep in mind that with Cities Service you have under your banner such nationally advertised products as Koolmotor Gasolene, Koolmotor and Cities Service Motor Oils, Trojan Lubricants, and Acme Tires and Batteries.

And there's plenty of profit for you in such specialty items as Cisco Solvent and Cisco Pep and in such exclusive service features as the Power Prover and Ride Improver—all business builders and real money makers.

For your own interest, as well as ours, we'd like an opportunity to tell that story to you. So wait; don't sign on that dotted line until you've listened to your Cities Service salesman.

"It pays to sell Cities Service Products because Cities Service helps you do the selling"
HELP GIVE YOUR CAR
AN EXTRA
YEAR OF YOUTH

All this support is yours when you sign with Cities Service

Exclusive Properties—Don't forget, in addition to our line of regular petroleum products, no other company can offer such new, profitable service features and specialties as the Ride Improver, Power Prover, Cisco Solvent and Cisco Pep.

Radio—The Cities Service Concert, radio's oldest program, entertains millions of listeners every Friday night. Lucille Manners, Frank Black, Ross Graham and Ford Bond help you sell Cities Service products.

Magazines — Cities Service's 1941 theme "an extra year of youth for your car" reaches key executives in pages of weeklies and monthlies.

Outdoors — They read while they ride—and Cities Service billboards and posters attract customers at the ideal time—right when they're on the highway.

Cash in — Think what this complete selling program can mean to your business. Why not get all the details on this money-making merchandising? A Cities Service representative will be glad to discuss it with you.

CITIES SERVICE OIL COMPANIES

CITIES SERVICE OIL COMPANY—Chicago, New York, Cedar Rapids, Boston, St. Paul, Grand Forks, Syracuse, Kansas City, Ft. Worth, Oklahoma City, Milwaukee, Cleveland, Detroit.
CITIES SERVICE OIL COMPANY, LTD.—Toronto, Canada.
ARKANSAS FUEL OIL COMPANY—Shreveport, Little Rock, Jackson, Birmingham, Atlanta, Charlotte, Nashville, Richmond, Miami.

average consumer looks upon them as service station attendants, we see no reason to assume the stigma present in many consumers' minds of the name of salesman."

We wonder if other marketers agree with Mr. Sinn.

100% Increase—Cost only 33%

Changing pump islands to parallel traffic so that the motorist can pull up to the pumps with minimum effort requires 2 twin islands instead of one triple pump island.

But the two twin islands can handle 4 cars at a time. The triple island can only service two.

This means a 100% increase with outlay for new equipment of only 33%.

Contests Lick Premium Oil Price Cutting

It is always interesting to know what large marketers do about price cutting on oils, or selling on price. One of these companies who seem to have the answer is the Baron-Huot Oil Co. of Kankakee, Ill. They write:

"To meet cut prices on some premium oils, we sell our secondary oil and guarantee it will out-perform many premium oils. In this way, it is not necessary for our dealers and lessees to cut the price on a high quality piece of merchandise.

"Special Lube campaigns, both in oils and greases have always stimulated sales on premium oils. This 'shot in the arm' very seldom drops for a number of months, as during the campaign and following it for the next 3 or 4 months, premium oils show a decided increase. When secondary and third grade oils begin to come too close to premium oil sales, another contest is run to boost sales on premium grades. Prizes are awarded, but no discount or special price is given on the oils."

In the Mail Bag

McCornack Oil Co. of St. Charles, Ill., tells us that demand for particular brands of oils is greatly diminishing. . . .

Scholl Oil Co. of Connersville, Ind., believe that a good many of their customers are influenced on their oil change habits by what their company does with its own cars and trucks. . . .

R. C. Miller of the R. C. Miller Oil Co., Bryan, O., uses one of his own trucks in promoting Spring and Fall Change-Over business. Mr. Miller writes:

"A good way to promote Change-Over is from the angle of worn parts. We have a wrecker with 75,000 miles on it that has the original piston pins in it; and they are not loosened a bit. This car was lubricated and oil changed regularly at 700 miles ever since it left the factory, and has never had any repairs except one set of rings."

1,000,000 pumps to date . . . here at Viking we're pretty proud of that accomplishment. But we know that what really counts, both with us and with you, is what these 1,000,000 pumps have done. Many Viking Rotary Pumps are still in use after 20 and 25 years of constant service. Viking installations are to be found in practically every industry, in all 48 states and in countries the world over. They have saved millions of pumping hours and dollars, made possible the production of many new products, helped streamline modern industry.

LOOK FOR THIS TRADE MARK—THE SIGN OF A GENUINE VIKING!

In building 1,000,000 pumps, many of them for the Oil Industry, we've learned a lot about petroleum pumping problems and how to solve them. Perhaps we can help you. Bulletin 2500-40 will give you a good idea of what Viking can offer. Write for a copy.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

TRADEMARKS

The following are trademark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Munsey Building, Washington, D. C., trademark specialists.

VAPOR-MIZER, Ser. No. 432,819, Graver Tank & Mfg. Co., Inc., East Chicago, Ind. Filed June 8, 1940. VAPOR disclaimed apart from the mark. For vapor reservoir tanks for controlling the vapor pressure in gasoline storage tanks. Published: March 4, 1941.

MOTH FOE and picture of a moth, Ser. No. 439,196, Duratex Chemical Corp., New York, N. Y., assignor to Duratex Chemical Corp., Englewood, N. J., a corporation of New Jersey. Filed: Dec. 26, 1940. For insecticide. Published: March 4, 1941.

ELCO "28" GEAR SAFETY on shield, "28" disclaimed apart from the mark, Ser. No. 438,070, The Elco Grease and Oil Company, Cleveland, Ohio. Filed: Nov. 20, 1940. For lubricating oils and greases. Published: March 4, 1941.

QUICK-CIDE, Ser. No. 439,243, Tersch Patents and Chemicals, Inc., New York, N. Y. Filed: Dec. 27, 1940. For insecticides. (QUICK disclaimed apart from the mark). Published: March 11, 1941.

KOLOR KUT, Ser. No. 439,606, Charles M. Smythe, doing business as Kolor Kut Products Co., Houston, Texas. Filed: Jan. 11, 1941. For material in the form of a paste used for determining the presence of water in gasoline, kerosene, gas oils, and other oils derived from petroleum. Published: Feb. 25, 1941.

PURE WOCO PEP KING OF MOTOR FUEL (no claim made to the words PURE MOTOR FUEL apart from the mark). Ser. No. 424,148, The Pure Oil Co., Chicago, Ill. Filed: Oct. 2, 1939. For gasoline and Motor fuel oils. Published: Feb. 25, 1941.

SUPRA, Ser. No. 437,352, Riley Penn Oil Co., Burlington, Iowa. Filed: Oct. 28, 1940. For lubricating oils and greases. Published: Feb. 25, 1941.

Change-Over Selling This Year Must Be Tuned to the Times

Here are some general ideas for the busy marketer or manager to think about in connection with this Spring Change-Over campaign: a few things that he might want to make notes of before paying a personal visit to his stations and dealers. Included are ideas for those who always expect the manager to pull a special trick for them right out of the hat.

Reading time:
7 minutes, 10 seconds

MANAGEMENT, in its 1941 Spring Change-Over campaign, faces the necessity of a more vigorous and difficult job this year than for some time past. This is true for several reasons.

Last year, nature cooperated by giving motorists a long, tough winter. This made the Change-Over program more of an "order taker" proposition than a selling job.

It is true that this year the St. Patrick's day blizzard will stick in the minds of motorists in the zones where this snow storm and accompanying cold weather struck. Still, the past winter's weather cannot be the theme for Change-Over selling as was the case last winter. An opportunist might adopt a slogan this year of "spend part of your winter's saving on heat for a Change-Over this spring."

Personnel A Problem

This year personnel is more of a problem than was the case last spring because of Army draft and war defense work. Many ordinary details of the past year's Change-Over preparedness which were matters of routine to old operators must be explained in detail to new men this year.

Selling prospects today are different than a year ago. There will be many car owners to educate who have purchased their first car—even though it may be 3rd or 4th handed. Perhaps there will be some old gasoline dealers who have been selling down to a price the past few years who could profitably learn about selling quality—premium tires, for instance, instead of worrying about the mail order prices.

Need For Education

All of this adds up to the necessity for EDUCATION. Education of the kind that teaches station men and dealers not only the reason for Spring Change-Over and what it consists of and how to do it, but also how to sell it to the customers and prospective customers.

This all means that management itself will, in many cases, have to dust off the old operating manuals and start at the very beginning on rather primary instructions, rules, regulations and ideas that have been dormant for some time.

Here are a few ideas for the manager's note book in checking up on his assistants, or perhaps in making personal contacts with salesmen, operators and attendants.

Uniforms

With the public daily becoming more uniform conscious, this item is more important now than ever for a successful Spring Change-Over campaign. The Army emphasizes neatness: shoes shined, buttons fastened, ties, and so on. The public expects neatness and thinks of it as meaning good service. Often a 100% clean-up campaign around a station is practically ruined by a bunch of sloppy looking uniforms, or perhaps none at all. Those operators or helpers who have delayed, as is the case a lot of times, in getting their summer uniforms in shape or replenishing their stock, should be reminded to do so quickly.

Advertising

Often, even after meetings have been held, some stations fail to do their part in the Spring Change-Over campaign. They forget about putting up their banners, or taking down the old ones. Or they may not know the marketers or the suppliers schedule for running ads, or radio or bill board campaigns of which the station is a vital part in the chain. New men usually have to be told not to put up too many signs; to place them at right angles of traffic; to display reprints of the company advertising as a tie-in; to have twine on hand if banners are to be used—and to get them up a certain day, not the day before or after. These and many other little things that were more or less automatic in the past are liable to be overlooked. Even by the supervisor or salesman.

Equipment

For this year's Spring Change-Over campaign, more than ever, all equipment must be in good working order; customers are in a bigger hurry, and new and perhaps older men are doing the work. Grease guns that have "seen their day", air compressors that are being overworked and slowing

Important Savings IN SERVICE AND HOSE COSTS!

GOODALL *"Torsion-Twist"*

SYNPLASTIC CURB PUMP HOSE

"Torsion-Twist" is a tough, long-wearing curb pump hose of a new circular-woven construction. As its name implies, it twists without kinking, hangs without stiffening and setting, and springs back into shape if run over or otherwise crushed. Cover withstands the elements, stays smooth, easy to clean. No wire in carcass except copper strand for static.
Style R-29—Synplastic Tube, Rubber Cover.
Style R-33—Synplastic Tube, Synplastic Cover.

Enlargement shows "Torsion-Twist" construction—another "first" for GOODALL

GOODALL RUBBER CO., Inc.
4 SOUTH 36th STREET, PHILADELPHIA, PA.
MILLS: TRENTON, N. J. EST. 1873
Branches and Distributors from Coast to Coast

GOODALL RUBBER CO., Inc.
4 SOUTH 36th ST., PHILA., PA.
Please send circular describing the money-saving advantages of "*Torsion-Twist*" CURB PUMP HOSE

Name .....
Address .....
City & State .....
Att. of .....

down operations, pump and air hose that is about ready to give out, and other obsolete equipment are some of the handicaps that should be removed by replacement with modern equipment if possible. Modern, fast-working equipment is easier to get these days than men.

Service Station Inspection

There are 13 major inspection points necessary to complete a service station. These are:

Gasoline pumps
Driveways
Underground tanks
Building exterior
Building interior
Rest rooms
Lubritorium
Lifts
Lighting
Fire Extinguishers
Air compressor
Air service outlets
Heating system

Under the heading of these major inspection items, there are 121 important things to check. Usually the marketer or manager delegates the detailed inspection to an assistant. Many marketers use NPN service station inspection manuals for making this check.

Stocks

There are few stations that do not have some left-over stock on hand when the seasons change. Nothing looks worse than a display of shelf-worn, unseasonable stock. Where winter items are not returnable, they can be wrapped and stored for fall. Usually items that have been on the shelves a long time, even if they are seasonable, are in boxes that give them a second-hand look. Many operators get new cartons from the manufacturers for displaying this merchandise during the spring season. Tires may be rewrapped for a very small charge.

Does the station have sufficient stock of the necessary oils, grease and supplies to not only take care of the business, but also to provide for window displays, island displays, and perhaps displays on the driveway to give the impression of an up and going station, rather than one on the way out?

Follow Up

There are few stations these days without a prospect and follow up record system. Some of them have been neglected during the past winter. The mailing cards in some case are obsolete, or perhaps dirty. The prospect cards, particularly, should be in good shape now. Purchasers of used cars are regular gold mines from the accessory and tire angle. They have not become "hardened" to solicitation, and they apreciate and act on suggestions for items to make their cars look better or run longer. This is a vital part of the Spring Change-Over campaign.

Suggestions

Regardless of how elaborate the Spring Change-Over sales promotion might be, operators generally expect the manager, or "boss" to have a "tailor made" idea especially for them when he comes around—something different. Usually the manager does have some idea that will fit a particular station, but perhaps would not work in all of the outlets. Here are a few, picked up here and there by NPN, that might help:

Personal Message

Emerson Miller, Mobilgas station operator in Beverley Hills, successfully used a record idea in getting new customers and building up his business. First, Emerson built up a good list of prospects. Then he had personalized phonograph recordings made at a cost of 10c each on composition records. He used the prospect's name several times in the record and also printed it on the outside of the record. He then delivers the record to the prospect's home and asks him to play it on his phonograph. Advantages of dealing with Miller, particularly on lubrication work, are outlined.

Wild Flower Information

A plan to get spring business was used by Bakersfield, Cal., dealers. They went together on the purchase of display boards and posters for their stations, offering free wildflower information. Car stickers and colored post cards were part of the campaign. The stunt attracted hundreds of tourists into these dealers' stations. The plan would be equally effective in promoting any local points of interest.

Doctors' Cars

A Cincinnati station, near a hospital, secured a great deal of business by soliciting physicians for lubrication work. One of the helpers was stationed at the hospital parking lot. He found it quite easy to sell the physicians on the idea of having all necessary work done while the doctor was making his rounds in the hospital. The plan could be followed by simply placing a card under the wiper blade telling the doctor to call the station the next time he is to be in the hospital any length of time.

Mondays Are Favored For All Holidays

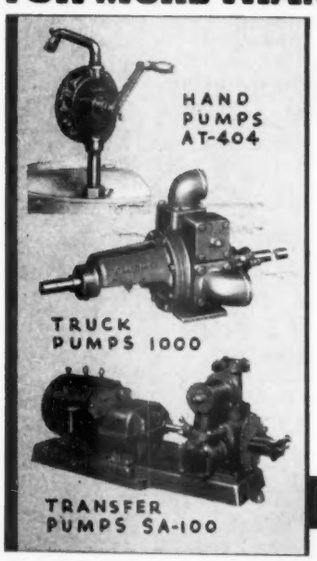
N. P. N. News Bureau

WASHINGTON, April 15.—National Park Service Travel Bureau proposal to celebrate all holidays on Monday has been endorsed by P. H. Patchin, director, Standard Oil Co. of California.

Patchin has advised travel bureau Monday holidays would benefit (1) public, by providing more useful period for rest and recreation, (2) defense industries, through elimination of mid-week shutdowns; and (3) large segment of national business interested in travel—national parks, hotels, resorts, transportation companies, and those selling supplies, such as gasoline, to traveling public.

EXPERIENCED OILMEN
KNOW THAT THIS "Mark" Means
A DEPENDABLE PUMP because
FOR MORE THAN 30 YEARS

BLACKMER PUMPS
BUCKET DESIGN
AUTOMATIC TAKE-UP FOR WEAR



BLACKMER
• ROTARY •
PUMPS

. . . . . have been "standard equipment" for handling petroleum products.

26 years continuous service is not unusual for Blackmer Rotaries. Let us show you why these pumps deliver MORE GALLONS PER PENNY.

Write for Bulletin No. UB320

BLACKMER PUMP COMPANY
1884 Century Avenue, S.W. Grand Rapids, Michigan

Annual Reports

Tidewater Associated Oil Co.

After deducting all charges, including estimated federal income taxes, Tide Water Associated Oil Co.'s income for 1940 amounted to $9,519,083, compared with $8,958,971 the previous year, according to the company's annual report just released.

"These figures reflect an increase of $560,112 in the income of the year 1940," the report said, "a large portion of which was due to increased sales volume of kerosine and heating oils and relatively satisfactory gasoline prices obtained during the first quarter of the year."

But the report adds that "subsequently, however, sales realizations on most of the major petroleum products declined, and this condition is reflected in the lower earnings of the last three quarters of the year . . . ."

Reporting on expenditures in the marketing divisions, the report has this to say: "The keen competition among companies marketing motor fuels and lubricants continues, and the motorists' very evident partiality to the most modern retail outlets necessitates comparatively large expenditures for the installation of facilities of modern design and higher operating efficiency." After describing progress in modernizing its marketing outlets, the report added "with resulting profits."

Unsatisfactory conditions recognized in the report included drastic reductions in exports of petroleum, resultant increase in available supplies in this country and prices in some marketing areas said to be the "lowest in 20 years."

Installation of a catalytic cracking unit at Tide Water's Bayonne, N. J. plant and an alkylation plant at its Avon, Calif. refinery "will contribute to this company's ability to serve the needs of National Defense," statement said.

* * *

Barnsdall Oil Co.

Net profit of Barnsdall Oil Co. totaled $2,193,471.15 in 1940, after allowance for taxes, depreciation and other deductions, according to the company's annual report to stockholders. Profits in 1940 exceeded those of the previous year by $473,178.92, the report revealed.

"Notwithstanding the chaotic conditions existing throughout the World, the consumptive demand for petroleum products established a new record," President E. B. Reeser said, adding that "unfortunately the low level of crude and petroleum product prices continued to hold earnings of the industry at a low level."

Across the Bay
from the Great White Way

Bulk liquids come to Carteret, not to see the sights of Broadway but to save you a "sight" of money! Here at the Atlantic seaboard's largest public terminal are facilities for speedy storage and re-distribution—with all seven *exclusive* advantages of General American service. If you ship east by rail or coastwise steamer, you'll be money ahead when you use Carteret.

ONLY GENERAL AMERICAN GIVES ALL THESE ADVANTAGES:

1. NO CONTAMINATION. Separate pumps, lines, storage zones for dissimilar commodities.
2. MODERN PROTECTION. Latest safety appliances; lowest insurance rates, minimum evaporation losses.
3. RELIABLE CUSTODIANSHIP. Our warehouse receipts are highest type of collateral everywhere.
4. INDEPENDENT OWNERSHIP. Strictest privacy; we do not buy, sell or refine any commodities.
5. NO WHARFAGE. There is no wharfage charge at our own private docks.
6. SPEED WITH SAFETY. Day and night crews, complete facilities, eliminate all shipping delays.
7. WORLD'S LARGEST TANK CAR FLEET. One car or hundreds, wherever and whenever needed.

Strategically located to serve you!

GATX GENERAL AMERICAN

GENERAL AMERICAN
TANK STORAGE TERMINALS

Goodhope, La. and Westwego, La., (Port of New Orleans)
Corpus Christi, Texas
Carteret, N. J. (Port of New York) Galena Park, Texas (Port of Houston)

A DIVISION OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Burner Consumption East of Rockies High in March

Heating oil consumption per burner in March was higher than normal in all sections except the Pacific Coast. Despite the cold March, the season's requirements to April 1 are not as high as for the preceding winter except in upper New England.

BLIZZARDS and extreme cold in March increased consumption by oil burners east of the Rockies considerably above normal; some points were 15-20% higher, as calculated from temperature deficiencies in Degree-Days, reported to NATIONAL PETROLEUM NEWS by local Weather Bureaus.

In but few cities, however, were individual burner requirements above those of March, a year ago, which was also a month when the cold was biting. Consumption in upper New England was larger than in March, 1940; in Boston and Philadelphia the same; in New York 3% less.

In the middle west, consumption in Chicago was 13% above normal, and the same as last March. In St. Louis, extreme low temperatures increased consumption per burner to 11% higher than last March and 17% higher than in a normal March. In Denver, requirements were 25% higher than last March, but only 8% above normal.

The Pacific Coast continued to enjoy high temperatures in March and individual burner consumption was from 26 to 44% lower than normal and well under March, 1940, requirements.

SEASON TO APRIL 1

In New England and northern Atlantic states, where about half the heating oil business of the country is done, requirements for the season to April 1 are above normal, in New England by around 9%; in Boston and New York City about 2%. Except for upper New England and an occasional point in New York state, per burner consumption has been under the 1939-40 season.

In the north central states, requirements for the season are a little under normal and under those of last season by about the same extent, except in St. Louis and Kansas City, where even with the extreme cold spell in March, consumption this season has been around 10% less than in the previous winter.

In Pacific Coast cities, consumption for the season has been around 20% less than normal and to April 1 slightly less than last winter.

Table 1—March Heating Oil Requirements, in Degree Days

	March Normal DDs	Actual March 1941 DDs	% Above or Below Normal Needs	% Above or Below March 1940	% Normal Season's Needs Used in Mar. 1941	% Normal Season's Needs Used in Normal March	Total DDs in Normal Season
NEW ENGLAND							
Portland, Me.	1017	1171	+15	+ 9	16.8	14.6	6973
Burlington, Vt.	1112	1280	+15	— 3	17.1	14.8	7486
Boston	911	981	+ 8	0	16.2	15.0	6058
Providence, R. I.	839	960	+14	— 3	16.9	14.7	5689
Hartford, Conn.	861	1033	+20	— 1	17.1	14.3	6019
MIDDLE ATLANTIC							
New York City	846	908	+ 7	— 3	17.2	16.0	5290
Albany	929	1150	+24	— 3	17.6	14.2	6516
Rochester	1023	1232	+20	+ 6	18.6	15.4	6620
Buffalo	1053	1203	+14	+ 2	17.9	15.7	6723
Trenton, N. J.	712	915	+29	0	17.6	13.7	5190
Philadelphia	752	856	+14	0	17.9	15.7	4792
SOUTH ATLANTIC							
Baltimore	678	771	+14	0	16.7	14.6	4628
Washington	632	779	+23	+ 3	16.9	13.9	4620
Richmond	554	715	+29	+13	18.9	14.5	3820
NORTH CENTRAL							
Cleveland	943	1068	+13	+ 1	17.4	15.3	6144
Chicago	903	1018	+13	0	15.9	14.2	6378
Detroit	980	1068	+ 9	— 5	16.6	15.2	6454
Milwaukee	1011	1104	+ 9	— 2	15.5	14.2	7117
Minneapolis	1082	1145	+ 6	— 9	14.5	13.7	7895
St. Louis	638	748	+17	+11	16.1	13.7	4658
Des Moines, Ia.	835	898	+ 8	+ 8	14.2	13.2	6329
Omaha	851	865	+ 2	— 5	13.9	13.7	6229
Kansas City	684	754	+10	+ 8	14.7	13.4	5104
Denver	796	864	+ 8	+25	14.9	13.7	5790
PACIFIC COAST							
Seattle, Wash.	558	367	—34	—15	8.5	12.9	4306
Portland, Ore.	561	312	—44	—24	7.1	12.9	4367
San Francisco	279	207	—26	—12	8.7	11.3	2382

Table 2—Season's Heating Oil Requirements to April 1, 1941

	Sept.-Mar. Normal DDs	Actual Sept.-Mar. 1941 DDs	% Above or Below Normal	% Above or Below Sept.-Mar. 1940	% Normal Season's Needs Used in Sept.-Mar. 1941	% Normal Season's Needs Used in Sept.-Mar. 1940	% Normal Season's Needs Used in Normal Sept.-Mar.
NEW ENGLAND							
Portland, Me.	6002	6572	+ 9	+ 6	94.4	88.7	86.1
Burlington, Vt.	6573	7144	+ 9	— 3	95.4	98.1	87.8
Boston	5255	5383	+ 2	— 2	88.8	90.3	86.8
Providence, R. I.	4938	5264	+ 7	— 4	92.5	95.7	86.8
Hartford, Conn.	5275	5743	+ 9	0	95.4	96.3	87.6
MIDDLE ATLANTIC							
New York City	4683	4785	+ 2	— 4	90.5	93.8	88.5
Albany	5734	6463	+13	— 4	99.2	103.1	88.0
Rochester	5772	6259	+ 8	+ 2	94.5	93.0	87.2
Buffalo	5733	6019	+ 5	— 2	89.5	91.8	85.3
Trenton, N. J.	4613	4914	+ 7	— 3	94.7	97.6	88.9
Philadelphia	4329	4525	+ 5	— 3	94.4	97.5	90.3
SOUTH ATLANTIC							
Baltimore	4171	4105	— 2	— 4	88.7	92.9	90.1
Washington	4163	4139	0	— 6	89.6	95.8	90.1
Richmond, Va.	3554	3798	+ 7	— 6	99.4	105.7	93.0
NORTH CENTRAL							
Cleveland	5359	5280	— 1	— 4	85.9	89.5	87.2
Chicago	5553	5387	— 3	— 3	84.5	87.5	87.1
Detroit	5671	5746	+ 1	— 3	89.0	92.1	87.9
Milwaukee	6131	5900	— 4	0	82.9	83.1	86.1
Minneapolis	7060	6933	— 2	— 2	87.8	89.6	89.4
St. Louis	4266	4104	— 4	—11	88.1	99.4	91.6
Des Moines, Ia.	5704	5473	— 4	— 7	86.5	93.2	90.1
Omaha	5657	5352	— 5	— 9	85.9	94.2	90.8
Kansas City	4665	4423	— 5	—10	86.6	96.1	91.4
Denver	4997	4684	— 6	+ 2	80.9	78.9	86.3
PACIFIC COAST							
Seattle, Wash.	3655	2908	—20	— 3	67.5	69.5	85.5
Portland, Ore.	3720	2938	—21	— 2	67.3	68.4	85.2
San Francisco	1925	1499	—22	— 4	62.9	66.0	80.8

MARKETS

Gulf

NEW YORK, April 12. — Higher prices for many refined products at the Gulf were reported by refiners during the week ended April 12, with low quotations for all grades of gasoline up 0.125 to 0.375c and for kerosine, No. 2 fuel oil, and some grades of gas oil up 0.125c. Diesel oil for ships' bunkers was reported 10c higher at $1.45, and cargoes of Bunker "C" oil were reported 2.5c higher at $0.825.

Late in the week a cargo of unleaded min. 80 oct. ('39 research) gasoline was reported sold at 5.875c. Quotations reported by refiners for leaded material of this rating ranged from 5.50 to 6c. One refiner said he had turned down grade at 5.50c for prompt coastwise an inquiry for 75-80,000 bbls. of this lifting.

Two 75,000-bbl. sales of 68 oct. unleaded gasoline at 5.50c, were reported by refiners.

Early in the week a refiner reported two 8000-bbl. barge lots of No. 2 fuel sold at 3.25c for mid-April lifting. A cargo of kerosine was said to have sold at 3.375c, but reports could not be confirmed.

Two inquiries for gasoline were reported late in the week, one for 80,000 bbls. of min. 80 oct. for coastwise lifting the first half of May and one for 75,000 bbls. of 72-74 oct. leaded for late April-early May coastwise lifting. Inquiries for 75,000 bbls. of No. 2 fuel for coastwise lifting late April to early May and for a 40,000-bbl. cargo of Bunker "C" oil for late April also were reported.

Mid-Continent

TULSA, April 12.—Prices for most grades of gasoline were up 0.125c on both highs and lows of price ranges in Oklahoma, according to reports of refiners the past week. Shipments against contracts continued heavy, it was said, with several refiners reporting orders were "cutting stocks to pieces."

Quotations reported by Oklahoma refiners ranged from 4.875 to 5.25c for 72-74 oct., 4.50 to 4.875c for 63-66 oct. and 4.125 to 4.50c for 60 oct. and below.

"Less low priced competition" on gasoline was reported by an Oklahoma refiner who had been quoting "4.625 to 5c" for 72-74 oct. He said he was now quoting "4.875 to 5c" for 72-74, lower price applying only for shipments to restricted competitive areas. "Special restricted area prices are practically out of the picture as far as we are concerned," he added.

An Oklahoma refiner reported buying 15 cars of 72-74 oct. and 10 cars of 60 oct. and below at undisclosed prices. "We are still 5 days behind on shipments despite almost daily purchases," he added.

Prices reported for most grades of viscous neutrals were up 0.5c early in the week. Shipments of all lubes were heavy and stocks were low, refiners said. "I couldn't handle a 10,000-bbl. order for neutrals and it's nearly as bad on brights," one refiner remarked.

Kerosine shipments against contracts were in good volume, according to most refiners. One Oklahoma refiner reported buying 25 cars of 41-43 at 4c from another refiner for shipment within 10 days. "We could not find good material at a lower price," he said. Another refiner said he had bought 20 cars of 42-44 "at the market."

California

LOS ANGELES, April 12.—Further increases were reported the past week in quotations for cargoes of gasoline on Pacific Coast export markets. These advances averaged 0.125c per gal. Some suppliers, however, said they would be ready to accept prices on a parity with the Gulf if they received a firm offer and had tanker space available at the specified time of shipment.

Gasoline cargo quotations reported by suppliers ranged from 4.75 to 5c for 60 oct. minimum; 5.125 to 5.25c for 400 e.p., 65 oct. minimum; 5.25 to 5.50c for 390 e.p., 66 oct. minimum; 5.50 to 5.75c for 390 e.p., 68 oct. minimum; and 5.625 to 6c for 70 oct. minimum.

Preliminary estimates indicated that petroleum exports to Japan averaged 100,000 bbls. daily during the week ended April 12, as compared with 32,300 bbls. daily during the previous week. Increases were chiefly in refined products.

Pennsylvania

CLEVELAND, April 12. — Bright stock and neutral oil prices were reported 1c higher by western Penna. refiners in what some refiners described as "the tightest market in many months". Neutral oils particularly were practically unobtainable from refiners, according to reports of some buyers.

Quotations reported for 25 pour test oils at the end of the week were at 24c for 200 vis. neutral, 22c for 150 vis. neutral, and 16c for bright stock.

Four refiners reporting neutral oil quotations said their prices were for limited quantities only, and that they were offering only to their regular customers. Other refiners reported being sold up on neutrals for from 30 to 90 days.

Between 20,000 and 30,000 bbls. of bright stock were said to have changed hands in inter-refinery transactions during the week. One refiner said he had made some inter-refinery sales of 25 pour bright at 15c. Prices in other transactions were not disclosed. Four refiners reported quoting 16c to jobbers and compounders for 25 pour bright at the end of the week.

Quotations reported for white crude scale wax ranged from 3.05c to 3.50c, New York, for 122-124 A.M.P., and 3.25 to 3.50c, New York, for 124-126, up 0.05 to 0.25c per lb. Supplies were said to be closely held.

Mid-Western

CHICAGO, April 12.—Quotations reported for all refined products were higher the past week, according to reports of refiners and tank car marketers in Chicago.

Group 3 quotations reported by refiners at the end of the week ranged from 4.875 to 5.25c for 72-74 oct. gasoline, 4.50 to 4.875c for 63-66 oct., 4.10 to 4.50c for 60 oct. below, 4.125 to 4.50c for 41-43 kerosine, 4.25 to 4.625c for 42-44 kerosine, 3.375 to 3.50c for No. 2 straw fuel, and 3.25 to 3.375c for No. 3 fuel.

Group 3 quotations reported by tank car marketers ranged from 4.50 to 4.625c for 72-74 oct., 3.875 to 4.375c for 63-66 oct., 3.75 to 4c for 60 oct. below, 3.625 to 4.125c for 41-43 kerosine, 3.625 to 4.125c for 42-44 kerosine, 2.75 to 3.375c for No. 2 straw, and 2.625 to 3.375c for No. 3 fuel.

Open spot sales reported by three tank car marketers during the week were: 4 cars of 72-74 oct. gasoline, 1 car at 4.375c and 3 cars at 4.50c; 1 car, of 63-66 oct. at 4c; and 4 cars of range oil at 3.50c F.O.B. Group 3.

Atlantic Coast

NEW YORK, April 12.—Gasolines of all octane ratings were priced higher at New York during the past week following advances of 0.25c to 6.25c reported by suppliers in their tank car postings for these products at the harbor. Barge prices at New York also were reported 0.25c higher, at 6.25c for min. 80 oct. ('39 research) and 6c for lower octane grades.

An advance of 0.25c to 6.25c was reported in min. 80 oct. at Philadelphia, and at Boston both 72-74 and 68-70 oct. were reported 0.5c higher at 6.75c.

Fuel oils Nos. 2 and 3 were up 0.3c at New York and New England points, according to reports late in the week, with New York harbor prices for both products at 4.50c tank cars, and 4.40c barges. At Philadelphia and Baltimore, Nos. 2 and 3 fuels were reported 0.25c higher at 4.25c.

REFINERY and SEABOARD PRICES

In bulk lots by Motor Transport, Tank Car, Barge or Tanker as shown

(NOTE—Parenthetical figures after prices indicate number of companies quoting when less than three companies are quoting.)

HOW PRICES ARE REPORTED—

Refinery and Seaboard prices in National Petroleum News are gathered by PLATT'S OILGRAM and are as published in the Monday issue of the OILGRAM.

PLATT'S OILGRAM is a reporting service issued in three identical editions daily from News Bureaus at New York, Cleveland, and Tulsa, Okla. PLATT'S OILGRAM gathers and publishes what its publisher and representatives believe to be accurate news of sales, prices and current happenings affecting the oil industry and that will be of interest to its subscribers. As this information is usually private, OILGRAM reports it according to what it is able to obtain from sources deemed reliable.

All information is supplied without guarantee as to its completeness, accuracy time of transmission or promptness of delivery.

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Publisher reserves the right to change the extent, nature and form of showing this information at any time.

Prices shown in the tables are quotations (meaning sellers' general offers or posted prices), or actual sales prices, reported to OILGRAM by refiners for "open spot" transactions, except as otherwise specified.

Prices arrived at by discounts off a specified price or "market date of shipment," prices named in contracts or prices arrived at in accordance with any arrangement made prior to date of sale, are not for "open spot" transactions and therefore are not considered in making the price tables. Prices made to brokers and prices in "Inter-refinery" transactions are also not considered except as may be noted.

All prices are for "immediate" shipment except in Gulf Coast bulk transactions where shipment is generally to be made in ninety days. Prices are FOB refineries, pipelines, or tanker terminals in districts designated.

Prices shown are for quantities in bulk such as tank car lots, motor transport lots or barge lots; and in cents per gallon; heavy fuel oils are in dollars per barrel of 42 U.S. gallons; wax and petrolatums are in cents per pound. Prices applying to barges or cargoes only are so designated.

Prices do not include taxes or inspection fees. Prices are published at the close of the business day.

Mid-Western prices in the tables were gathered from refiners with offices located in Chicago and the surrounding territory. While the prices are quoted on a Group 3 (Oklahoma) freight basis, this is in accordance with the custom of the oil industry which uses Group 3 as a price basis for the ease of comparing prices even when the material originates in another refining district. Other refinery prices are given by and for the particular refining district where the material is made and from which it is shipped.

When prices obtained by OILGRAM do not conform to these conditions the exception and the new conditions are noted in the news lead or in conjunction with the price table by footnote or otherwise, for the particular refinery or sales district involved.

Crude oil and products covered by OILGRAM'S news and price service, except where noted, have been represented to the publisher as fully up to the customary trade specifications indicated and according to the generally accepted methods of test: and all crude oil and all products thereof as having been lawfully produced and transported.

Any apparent error should be reported to the nearest OILGRAM or National Petroleum News office at once as no correction will be made after the second issue of the OILGRAM or National Petroleum News following its publication.

Summary of Daily Gasoline Prices (Apr. 8 to Apr. 14)

	Latest Prices Monday, Apr. 14	Friday, Apr. 11	Thursday, Apr. 10	Wednesday, Apr. 9	Tuesday, Apr. 8
U. S. Motor, (ASTM octane)					
80-82 octane Ethyl:					
Oklahoma	5.50 – 6.125	5.375– 6.00	5.375– 6.00	5.375– 6.00	5.375– 6.00
Mid-Western (Group 3 basis)	5.875 (1)	5.875 (1)	5.875 (1)	5.875 (1)	5.875 (1)
N. Tex. (For shpt. to Tex. & N. M. dest'ns.)	5.875– 6.00	5.875	5.875	5.875	5.875
W. Tex. (For shpt. to Tex. & N. M. dest'ns.)	6.125 (1)	6.00 (1)	6.00 (1)	6.00 (1)	6.00 (1)
72-74 octane:					
Oklahoma	4.875– 5.25	4.875– 5.25	4.875– 5.25	4.875– 5.25	(a) 4.875–5.25
Mid-Western (Group 3 basis)	4.875– 5.25	4.875– 5.25	4.875– 5.25	4.875– 5.25	4.875– 5.25
N. Tex. (For shpt. to Tex. & N. M. dest'ns.)	4.875– 5.50	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
W. Tex. (For shpt. to Tex. & N. M. dest'ns.)	5.00–5.125 (2)	5.00 (2)	4.875–5.00 (2)	4.875–5.00 (2)	4.875–5.00 (2)
63-66 octane:					
Oklahoma	4.50 – 4.875	4.50 – 4.875	4.50 – 4.875	4.50 – 4.875	4.50 – 4.875
Mid-Western (Group 3 basis)	4.50 – 4.875	4.50 – 4.875	4.375– 4.875	4.375– 4.875	4.375– 4.875
N. Tex. (For shpt. to Tex. & N. M. dest'ns.)	4.50 – 5.125	4.375– 5.00	4.375– 5.00	4.375– 5.00	4.375– 5.00
W. Tex. (For shpt. to Tex. & N. M. dest'ns.)	4.625 (2)	4.375–4.625 (2)	4.375–4.50 (2)	4.375–4.50 (2)	4.375–4.50 (2)
60 octane & below:					
Oklahoma	4.125– 4.50	4.125– 4.50	4.125– 4.50	4.125– 4.50	4.125– 4.50
Mid-Western (Group 3 basis)	4.10 – 4.50	4.10 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50
N. Tex. (For shpt. to Tex. & N. M. dest'ns.)	4.125– 4.75	3.875– 4.50	3.875– 4.50	3.875– 4.50	3.875– 4.50
W. Tex. (For shpt. to Tex. & N. M. dest'ns.)	4.125–4.25 (2)	4.00–4.25 (2)	4.00–4.25 (2)	4.00–4.25 (2)	4.00–4.25 (2)
Motor Gasoline, 72-74 octane (ASTM)					
New York harbor	6.25 – 7.00	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
New York harbor, barges	6.00 – 6.75	6.00 – 6.50	6.00 – 6.50	6.00 – 6.25	6.00 – 6.25
Philadelphia district	6.00 – 6.375	6.00 – 6.375	6.00 – 6.375	6.00 – 6.25	6.00 – 6.125
Baltimore district	6.25–6.375 (2)	6.25–6.375 (2)	6.00 – 6.375	6.00 (2)	6.00 (2)
Motor Gasoline:					
74-76 Octane: (L-3)					
Bradford-Warren (Western Penna.)	6.00–6.25 (2)	6.00–6.25 (2)	6.00–6.25 (2)	6.00–6.25 (2)	6.00–6.25 (2)
Other Districts (Western Penna.)	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00

REFINERY PRICES

Gasoline—U. S. Motor (ASTM Octane) except where otherwise specified

Prices Effective	Apr. 14	Apr. 7
OKLAHOMA		
80-82 oct. Ethyl	5.50 – 6.125	5.375– 6.00
72-74 oct.	4.875– 5.25	4.875– 5.25
63-66 oct.	4.50 – 4.875	4.50 – 4.875
60 oct. & below	4.125– 4.50	4.125– 4.50
60-62 400 e.p.	4.125 (2)	4.00–4.125 (2)
MID-WESTERN (Group 3 basis)		
80-82 oct. Ethyl	5.875 (1)	5.875 (1)
72-74 oct.	4.875– 5.25	4.875– 5.25
63-66 oct.	4.50 – 4.875	4.375– 4.875
60 oct. & below	4.10 – 4.50	4.00 – 4.50
N. TEX. (For shpt. to Tex. & N. M. dest'ns.)		
80-82 oct. Ethyl	5.875– 6.00	5.75 – 5.875
72-74 oct.	4.875– 5.50	4.75 – 5.25
63-66 oct.	4.50 – 5.125	4.125– 5.00
60 oct. & below	4.125– 4.75	3.875– 4.50
60-62, 400 e.p.	4.125–4.75 (2)	4.125–4.75 (2)
W. TEX. (For shpt. to Tex. & N. M. dest'ns.)		
80-82 oct. Ethyl	6.125 (1)	6.00 (1)
72-74 oct.	5.00–5.125 (2)	4.875–5.00 (2)
63-66 oct.	4.625 (2)	4.375–4.50 (2)
60 oct. & below	4.125–4.25 (2)	4.00–4.25 (2)
CENT. W. TEX. (Prices to truck transports)		
80 oct. & above	6.00 (1)	6.00 (1)
72-74 oct.	4.875 (1)	4.875 (1)
67-69 oct.	4.375 (1)	4.25 (1)
62 oct. & below	4.00 (1)	3.875 (1)
AMARILLO, TEX. (For shpt. to W. Okla. & Tex. differential territory.)		
60 oct. & below	4.625 (2)	4.50 (1)
60-62, 400 e.p.	4.875 (1)	4.75 (1)

Prices Effective	Apr. 14	Apr. 7
KANSAS (For Kansas destinations only)		
80-82 oct. Ethyl	6.00 (1)	6.00 (1)
72-74 oct.	5.00 – 5.313	5.00 – 5.125
63-66 oct.	4.625– 4.938	4.625– 4.75
60 oct. & below	4.25 – 4.563	4.25 – 4.375
ARK. (For shipment to Ark. & La.)		
72-74 oct.	4.875 (1)	4.875 (1)
70-72 oct.	4.75 (1)	4.75 (1)
60 oct. & below	4.375 (1)	4.375 (1)
WESTERN PENNA. (Motor gasoline.)		
Bradford-Warren:		
74-76 oct. (L-3)	6.00–6.25 (2)	6.00–6.25 (2)
Other districts:		
74-76 oct. (L-3)	5.75 – 6.00	5.75 – 6.00
CENTRAL MICHIGAN (FOB Central Mich. refinery group basis for shpt. within Mich.; shpts. may originate at plants outside Central group)		
U.S. Motor: (Oct. L-3):		
72-74 oct.	7.00 – 7.25	7.00
67-69 oct.	6.50 – 6.625	6.50 – 6.625
Str. run gasoline, excluding Detroit shpt.	4.75 – 5.25	4.75 – 5.25
OHIO (S. O. Ohio quotations for statewide delivery and subject to exceptions for local price disturbances)		
72-74 oct.	7.375	7.125
CALIFORNIA U.S. Motor:		
58-61 grav., 375-400 e.p., 65 oct. & above	5.50 – 6.50	5.50 – 6.50
54-58 grav., for outside state shipment	4.75 – 5.50	5.00 – 6.00
54-58 grav., for instate shipment	4.50 – 5.00	4.50 – 5.50

Kerosine, Gas & Fuel Oils

Prices Effective	Apr. 14	Apr. 7
OKLAHOMA		
41-43 grav. w.w.	4.00 – 4.50	4.00 – 4.50
42-44 grav., w.w.	4.25 – 4.625	4.25 – 4.625
Range Oil	3.875– 4.125	3.875– 4.125
No. 1 P.W.	3.75 – 4.125	3.75 – 4.125
No. 1 straw	3.375–3.75 (2)	3.375–3.75 (2)
No. 2 straw	3.375– 3.625	3.375–3.625
No. 2 dark	3.25 (1)	3.25 (1)
U.G.I. gas oil	3.25 (2)	3.25 (2)
No. 3 fuel	3.25 – 3.375	3.25 – 3.375
No. 6 fuel	$0.70 (1)	$0.70 (1)
14-16 fuel	$0.85–$0.90 (2)	$0.85–$0.90 (2)
MID-WESTERN (Group 3 basis)		
41-43 grav. w.w.	4.125– 4.50	4.125– 4.50
42-44 grav. w.w.	4.25 – 4.625	4.25 – 4.625
Range Oil	3.875 (1)	3.875 (1)
No. 1 p.w.	3.75 – 4.00	3.75 – 4.00
No. 2 straw	3.375– 3.50	3.25 – 3.50
No. 3	3.25 – 3.375	3.125– 3.375
No. 5	$0.75–$0.85 (2)	$0.75–$0.85 (2)
No. 6	$0.65–$0.70 (2)	$0.65–$0.70 (2)
N. TEX. (For shpt. to Tex. & N. M. dest'ns.)		
41-43 grav. w.w.	3.875– 4.75	3.75 – 4.75
No. 1 P.W.	3.875 (1)	3.875 (1)
AMARILLO, TEX. (For shpt. to W. Okla. & Tex. differential territory.)		
41-43 grav. w.w.	4.625–4.75 (2)	4.50–4.75 (2)
No. 1 straw	4.00 (2)	4.00 (2)
KANSAS (For Kansas destinations only)		
41-43 grav. w.w.	4.25 (1)	4.25 (1)
42-44 gravity w.w.	4.375– 4.50	4.375– 4.50
No. 1 p.w.	4.00–4.125 (2)	4.00–4.125 (2)
No. 6 fuel	$0.675-$0.70 (2)	$0.675–$0.70 (2

(a) One refiner reported quoting "4.625-5.00" for 72-74 oct., the lower price applying only to shipments into restricted competitive areas.

REFINERY PRICES (Continued)

(NOTE—Parenthetical figures after prices indicate number of companies quoting when less than three companies are quoting.)

Kerosine, Gas & Fuel Oil

(Continued)

Prices Effective	Apr. 14	Apr. 7
ARK. (For shipment to Ark. and La.)		
41-43 grav. w.w.	4.375 (1)	4.375 (1)
No. 1	3.875 (1)	3.875 (1)
No. 2	3.375 (1)	3.375 (1)
No. 3 fuel	3.25 (1)	3.25 (1)
Tractor fuel, for shpt. to Ark. points only	4.25 (1)	4.25 (1)
WESTERN PENNA.		
Bradford-Warren:		
45 grav. w.w.	5.25 – 5.50	5.25 – 5.50
46 grav. w.w.	5.625 (1)	5.625 (1)
No. 1 fuel	5.125– 5.50	5.125– 5.50
No. 2 "	5.125–5.50 (2)	5.125–5.50 (2)
No. 3 "	5.50 (1)	5.50 (1)
36-40 gravity	5.25 (1)	5.25 (1)
Other districts:		
45 grav. w.w.	5.125– 5.25	5.125– 5.25
46 grav. w.w.	5.25 – 5.375	5.25 – 5.375
47 grav. w.w.	5.375– 5.625	5.375– 5.50
No. 1 fuel	4.875– 5.125	4.875– 5.125
No. 2 "	4.875– 5.00	4.875– 5.00
No. 3 "	4.75–4.875 (2)	4.75–4.875 (2)
36-40 grav., Pittsburgh dist. prices excluded	4.50 – 4.625	4.50 – 4.625
CENTRAL MICHIGAN (FOB Central Mich. refinery group basis for shpt. within Mich.; shpts. may originate at plants outside Central group.)		
47-49 gravity w.w.	5.50 – 5.75	5.50 – 5.75
P.W. Distillate	5.50	5.50
No. 3 gas oil, Straw	5.00 – 5.25	5.00 – 5.25
U.G.I. gas oil	4.25 – 4.50	4.25 – 4.50
Fuel Oils (Vis. at 100)·		
300-500 Vis.	3.75–4.00 (2)	3.75–4.00 (2)
100-300 Vis.	4.375 (1)	4.375 (1)
OHIO (S. O. Ohio quotations for statewide delivery)		
Kerosine	5.875	5.875
CALIFORNIA		
40-43 grav. w.w.	4.50 – 6.00	4.50 – 6.00
San Joaquin Valley:		
Heavy fuel	$0.575–$0.65	$0.575–$0.65
Light fuel	$0.65 –$0.75	$0.65 –$0.75
Diesel fuel	3.00 – 4.00	3.00 – 4.00
Stove dist.	3.00 – 5.00	3.00 – 5.00
Los Angeles:		
Heavy fuel	$0.575–$0.65	$0.575–$0.65
Light fuel	$0.65 –$0.75	$0.65 –$0.75
Diesel fuel	2.75 – 4.00	3.00 – 4.00
Stove dist.	2.75 – 4.00	2.75 – 4.00
San Francisco:		
Heavy fuel	$0.80	$0.80
Light fuel	$0.90	$0.90
Diesel fuel	4.50	4.50
Stove dist.	5.50	5.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Lubricating Oils

WESTERN PENNA.

Prices were given by Penna. refiners as their quotations to jobbers & compounders only. Neutral prices were reported by refiners as for limited sale to their regular customers only.

Viscous Neutrals—No. 3 col. Vis. at 70° F		
200 Vis. (180 at 100°) 420-425 fl.		
0 p.t.	27.50 (1)	27.50 (1)
10 p.t.	26.50 (1)	26.50 (1)
15 p.t.	25.50 (1)	25.50 (1)
25 p.t.	24.00 –25.00	23.00 –24.00
150 Vis. (143 at 100) 400-405 fl.		
0 p.t.	25.50 (1)	25.50 (1)
10 p.t.	24.50 (1)	24.50 (1)
15 p.t.	23.50 (1)	23.50 (1)
25 p.t.	22.00 –23.00	21.00 –22.00
Cylinder Stocks		
Brt. stk., 145-155 vis. at 210°, 540-550 fl., No. 8 col.		
10 p.t.	18.50 (1)	17.50 (1)
15 p.t.	17.50 (1)	16.50 (1)
25 p.t.	16.00 –17.00	15.00 –15.50
600 S.R. filterable	9.50 –11.00	9.00 –11.00
650 S.R.	9.00 –13.00	9.00 –13.00
600fl	10.00	10.00
630fl	11.00 –12.00	11.00 –12.00

MID-CONTINENT (F.o.b. Tulsa)

Neutral Oils (Vis. at 100° F. 0 to 10 P.P.)

Pale Oils: Vis.	Color		
60-85	No. 2	5.50 – 5.75	5.50 – 5.75
86-110	No. 2	5.50 – 6.25	5.50 – 6.25
150	No. 3	8.00 –10.25	8.00 –10.25
180	No. 3	9.00 –10.50	9.00 –10.50
200	No. 3	9.00 –11.00	9.00 –11.00
250	No. 3	10.50 –12.00	10.50 –12.00
280	No. 3	11.00 –13.75	11.00 –13.75
300	No. 3	12.00 –14.25	12.00 –14.25

Lubricating Oils (Cont'd)

Prices Effective	Apr. 14	Apr. 7
Red Oils:		
180—No. 5	9.00 (1)	9.00–9.50(2)
200—No. 5	9.00–11.00 (2)	9.00–10.50 (2)
280—No. 5	12.50 (1)	12.50 (1)
300—No. 5	11.50 –13.00	11.50 –12.50

Note: Viscous Neutrals, 15-25 p.p. generally are quoted 0.5c under 0-10 p.p. oils. Non-viscous oils, 15-25 p.p., generally are quoted 0.25c under 0-10 p.p. oils.

Bright Stock—Vis. at 210°		
200 Vis. D	19.00 (1)	19.00 (1)
150-160 Vis. D:		
0 to 10 p.p.	14.50 –16.00	14.50 –16.00
10 to 25 p.p.	14.00 –15.50	14.00 –15.50
25 to 40 p.p.	13.50–15.00 (2)	13.50–15.00 (2)
150–160 vis. E	13.50 –15.00	13.50 –15.00
120 Vis. D:		
0 to 10 p.p.	13.50 –15.25	13.50 –15.25
600 S.R. Dark Green	7.00 (2)	7.00 (2)
600 S.R. Olive Green	8.00 – 9.50	8.00 – 9.50
631 S.R.	12.00 (1)	12.00 (1)
Black Oil	4.00–5.50 (2)	4.00–5.50 (2)

SOUTH TEXAS Neutral Oils

Vis.	Color		
Pale Oils:	(*Vis. at 100°F*)		
100	No. 1½-2½	5.25 – 5.50	5.25 – 5.50
200	No. 2-3	7.25	7.25
300	No. 2-3	7.75	7.75
500	No. 2½-3½	8.50	8.50
750	No. 3-4	8.75	8.75
1200	No .3-4	8.875	8.875
2000	No. 4	9.00	9.00
Red Oils:			
100	No. 5-6	5.25–5.50 (2)	5.25–5.50 (2)
200	No. 5-6	7.25	7.25
300	No. 5-6	7.75	7.75
500	No. 5-6	8.50	8.50
750	No. 5-6	8.75	8.75
1200	No. 5-6	8.875	8.875
2000	No. 5-6	9.00	9.00

CHICAGO (From Mid-Continent p.l. crude.)

Neutral Oils (Vis. at 100° F. 0 to 10 p.p.)

Vis.	Color		
Pale Oils			
60-85	No. 2	7.25 (1)	7.25 (1)
86-110	No. 2	7.25 (1)	7.25 (1)
150	No. 3	9.00 (1)	8.50 (1)
180	No. 3	10.00 (1)	9.50 (1)
200	No. 3	10.00 (1)	10.00 (1)
250	No. 3	11.50 (1)	11.00 (1)
Red Oils:			
180	No. 5	10.00 (1)	9.50 (1)
200	No. 5	10.00 (1)	9.50 (1)
250	No. 5	11.00 (1)	11.00 (1)
280	No. 5	12.00 (1)	12.00 (1)
300	No. 5	12.50 (1)	12.00 (1)

Note: Viscous oils, 15 to 30 p.p. are quoted 0.5c lower; 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., 0.25c lower.

Unfiltered Steam Refined: (Viscosity at 210°)		
140	8.75 (1)	8.75 (1)
160	9.50 (1)	9.50 (1)
200	10.50 (1)	10.50 (1)
Bright stocks, 160 vis. at 210, No. 8 color:		
0 to 10 p.p.	16.00 (1)	15.00 (1)
15 to 25 p.p.	15.50 (1)	14.00 (1)
30 to 40 p.p.	14.50 (1)	13.50 (1)
E filtered Cyl. Stock	12.50 (1)	12.50 (1)

Note: To obtain prices delivered in Chicago, add 0.25c per gal.

Natural Gasoline

(Group 3 & Breckenridge prices are to blenders on freight basis shown below. Shipments may originate in any Mid-Continent manufacturing district.)

FOB GROUP 3		
Grade 26-70	2.875 (Sales)	2.875 (Sales)
FOB BRECKENRIDGE		
Grade 26-70	2.50 (qtns.)	2.50 (Sales)
CALIFORNIA (FOB plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	4.375– 4.625	4.375– 4.625

Naphtha and Solvent

Prices Effective	Apr. 14	Apr.
(FOB Group 3)		
Stoddard solvent	5.875– 6.25	5.875– 6.25
Cleaners' naphtha	6.375– 6.75	6.375– 6.75
V. M. & P. naphtha	6.375– 6.75	6.375– 6.75
Mineral spirits	5.375– 5.75	5.375– 5.75
Rubber solvent	6.375– 6.75	6.375– 6.75
Lacquer diluent	6.625– 7.75	6.625– 7.75
Benzol Diluent	7.875– 8.75	7.875– 8.75
WESTERN PENNA		
Untreated naphtha	5.50 – 6.00	5.50 – 5.75
Stoddard solvent	6.00 – 6.25	6.00
OHIO (S. O. Ohio quotations for statewide delivery):		
V.M.&P. naphtha, D.C. naphtha, Special Varnolene, Varnolene & Sohio solvent	8.75	8.75
Rubber solvent	8.25	8.25

Wax

White Crude Scale:

WESTERN PENNA. (Bbls. C.L., N. Y.)		
122-124 A.m.p.	3.25 – 3.50	3.05 – 3.25
124-126 A.m.p.	3.25 – 3.50	3.10 – 3.25
OKLAHOMA (Bbls. or burlap bags, C.L.)		
124-6 AMP	3.375 (1)	3.375 (1)
131-3 AMP	3.50 (1)	3.50 (1)

CHICAGO (FOB Chicago district refinery of one refiner, in bags or slabs loose, carloads. Melting points are EMP (ASTM) methods: add 3° F. to convert into AMP.)

Fully refined:		
122-124 (bags only)	5.60	5.60
125-127	5.60	5.60
127-129	5.85	5.85
130-132	6.15	6.15
132-134	6.40	6.40
135-137	7.15	7.15

Petrolatums

WESTERN PENNA. (Bbls., carloads; tank cars, 0.5c per lb. less.)			
Snow White	5.375– 6.375	5.125– 6.125	
Lily White	4.625– 5.375	4.375– 5.125	
Cream White	3.875– 4.375	3.625– 4.125	
Light Amber	2.875– 3.50	2.625– 3.25	
Amber	2.625– 3.125	2.375– 2.875	
Red	2.375– 3.00	2.375– 2.75	

Group 3 Freight Rates

To Division Headquarters Points of Standard Oil Co. of Indiana

	Gasoline Kerosine Cents per Cwt.	Cents per gal. 6.6 lbs.	Distillate-Gas Oil-Fuel Oil Cents per Cwt.	Cents per gal. 7.4 lbs.
Chicago, Ill.	40	2.640	32	2.368
Decatur, Ill.	39	2.574	31	2.294
Joliet, Ill.	40	2.640	32	2.368
Peoria, Ill.	39	2.574	31	2.294
Quincy, Ill.	36	2.376	29	2.146
Indianapolis, Ind.	48	3.168	39	2.886
Evansville, Ind.	46	3.036	37	2.738
South Bend, Ind.	49	3.234	**42	**3.108
Detroit, Mich.	64	4.224	51	3.774
Grand Rapids, Mich.	58.5	3.861	**50	**3.700
Saginaw, Mich.	66	4.356	53	3.922
Green Bay, Wis.	51	3.366	41	3.034
Milwaukee, Wis.	43	2.838	34.5	2.553
LaCrosse, Wis.	46	3.036	37	2.738
Minneapolis-St. Paul	46	3.036	37	2.738
Duluth, Minn.	52	3.432	41.5	3.071
Mankato, Minn.	46	3.036	37	2.738
Des Moines, Ia.	36	2.376	29	2.146
Davenport, Ia.	39	2.574	31	2.294
Mason City, Ia.	42	2.772	33.5	2.479
St. Louis, Mo.	33	2.178	26.5	1.961
Kansas City, Mo.	28	1.848	22.5	1.665
St. Joseph, Mo.	28	1.848	22.5	1.665
Fargo, N. D.	63	4.158	50.5	3.737
Minot, N. D.	83	5.478	66.5	4.921
Huron, S. D.	53	3.498	42.5	3.145
Wichita				
From Ponca City	7.5	*0.495	7.5	†0.555
From Tulsa	12.5	*0.825	12.5	†0.925
From Cushing	11	*0.726	11	†0.814

*This rate also includes distillate rate at 6.6 lbs. per gal.

**This rate applies only to residual fuel and gas oil.

†This rate is exclusive of distillate which is based on 6.6 lbs. per gal. from Ponca City, Tulsa and Cushing, Okla., to Wichita. Includes only gas oil and fuel oil.

NOTE: There is no Group 3 rate to Wichita, Kans.

SEABOARD PRICES EXPORT AND COASTWISE

(NOTE—Parenthetical figures after prices indicate number of companies quoting when less than three companies are quoting.)

Atlantic Coast

(Prices are of refiners, FOB their refineries & their tanker terminals, & of tanker terminal operators, FOB their terminals)—Prices Effective Apr. 14

MOTOR GASOLINE

District:	Min. 80 Oct. '39 Research (Max. 2 cc. Lead)	72-74 Oct. (ASTM)	68-70 Oct. (ASTM)	65-67 Oct. (ASTM)
N. Y. Harb.	6.25 – 7.50	6.25 – 7.00	6.25	....
N. Y. Harb., barges	6.25 – 7.50	6.00 – 6.75	6.00 (2)	....
Albany	7.50	....	....	....
Philadelphia	6.75 – 7.75	6.00 – 6.375	6.00 – 7.25	....
Baltimore	6.00 – 6.75	6.25–6.375 (2)	6.00–6.25 (2)	....
Norfolk	6.00 – 7.25	6.00 – 6.25	6.25 – 6.75	....
Wilmington	6.10 – 7.25	6.00–6.25 (2)	6.125– 6.75	....
Charleston	6.50 – 7.00	6.25 (1)	6.375–6.50 (1)	....
Savannah	6.25 – 7.00	6.00 (1)	6.125– 6.50	....
Jacksonville	6.00 – 7.00	5.75 (1)	6.00 – 6.25	....
Miami	6.625–7.00 (2)	....	6.375–6.50 (1)	....
Tampa	6.00 – 7.00	5.75 (1)	6.25–6.50 (2)	....
Pensacola	6.25–6.50 (1)	....	5.875–6.00 (1)	....
Mobile	6.125–6.50 (2)	....	5.875–6.00 (1)	....
Portland	7.70	....	....	....
Boston	7.60	6.75 – 7.50	6.75 (1)	....
Providence	7.60	6.85–7.50 (2)	....	....

FUEL OILS

	KEROSINE and/or NO. 1 FUEL	No. 2	No. 3	No. 5	No. 6
N. Y. Harb.	4.80 – 5.00	4.50	4.50	$1.55	$1.25
N. Y. Harb., barges	4.70 – 4.90	4.40	4.40	....	....
Albany	5.20 – 5.30	4.90	4.90 (2)	$1.85 (1)	$1.45 (1)
Philadelphia	4.75 – 5.25	4.50 – 4.75	4.50 – 4.75	$1.37 –$1.47	$1.25
Baltimore	4.75 – 5.25	4.50 – 4.75	4.50 – 4.75	$1.47 (1)	$1.25
Norfolk	5.00 – 5.25	4.50	4.50 (2)	.....	$1.25 (2)
Wilmington	4.75 – 5.25	4.25 – 4.50	....	.....	....
Charleston	4.75 – 5.25	4.50 (2)	....	.....	$1.20 (2)
Savannah	4.75 – 5.00	4.25 (1)	....	.....	$1.20 (1)
Jacksonville	4.875– 5.00	4.50 (1)	4.50 (1)	.....	$1.20 (1)
Miami	4.875–5.00 (2)	....	....	.....	....
Tampa	4.75 – 5.00	4.50 (1)	....	.....	$1.15 (1)
Pensacola	4.50–4.75 (1)	....	....	.....	.....
Mobile	4.50 – 4.75	....	....	.....	.....
Portland	5.20	4.90	4.90 (2)	$1.85 (1)	$1.25 –$1.45
Boston	5.10	4.80	4.80 (2)	$1.55 (2)	$1.25
Providence	5.10	4.80	4.80	$1.50 –$1.55	$1.25

	Bunker C Fuel Ships' bunkers (Ex Lighterage)	Diesel Oil Ships' bunkers (Ex Lighterage)	Diesel Oil Shore Plants	Gas House Gas Oil 28-34 Gravity
N. Y. Harbor	$1.25	$1.85	4.50–4.60 (2)	4.60 (2)
Albany	$1.45 (1)	$2.05 (1)	4.90 (1)	5.10 (1)
Philadelphia	$1.25	$1.85	.....	.....
Baltimore	$1.25	$1.75–$1.85	4.25 (1)	4.25 (1)
Norfolk	$1.25	$1.75–$1.85	4.25 (1)	4.25 (1)
Charleston	$1.20	$1.75–$1.85	4.25 (1)	4.25 (1)
Savannah	$1.20 (1)	$1.785 (1)	....	....
Jacksonville	$1.20 (2)	$1.785–$1.89	....	....
Tampa	$1.15 (2)	$1.785–$1.89	....	....
Portland	$1.25 –$1.45	$1.95	4.90 (1)	5.00 (1)
Boston	$1.25	$1.85	4.80 (2)	4.90 (2)
Providence	$1.25	$1.85	4.80 (1)	4.90 (1)

New York Export Lubes

(Penna. Products in bbls. FAS New York)

Prices Effective	Apr. 14	Apr. 7
Bright stock:		
Light, 25 p.t.	26.50 (1)	24.00 (1)
Neutral oil:		
150 3 color, 25 p.t.	29.00 (1)	29.00 (1)
600 s.r., unfilt.	19.00 (1)	18.00 (1)
650 s.r., unfilt.	19.50 (1)	18.50 (1)
600 fl. s.r.	20.00 (1)	19.00 (1)
630 fl., s.r.	21.00 (1)	20.00 (1)

Wax

(Melting points are AMP, 3° higher than EMP. Export prices FAS c.l. Domestic prices FOB, in bags, c.l. Scale solid; fully refined slabs.)

Prices Effective Apr. 14

	New Orleans Export	N. Y. Domestic	N. Y. Export
Crude Scale:			
124-6 Yellow	3.25 (1)	....	3.25 (1)
122-4 White	....	3.25–3.50	3.25–3.50
124-6 White	3.25–3.375(2)	3.10–3.50	3.25–3.50
Fully Refined:			
123-5	....	5.60 (a)	5.60(2)
125-7	5.60(1)	5.60(a)	5.60
128-30	5.60(1)	5.60–5.70	5.60
130-2	5.85(1)	5.85	5.85
133-5	6.15(1)	6.15	6.15
135-7	6.40(1)	6.40(2)	6.40
108-11 White Match wax (tight bbls.)			3.50 (1)

Naphtha

Prices Effective Apr. 14	V.M.&P. Naphtha	Mineral Spirits
Baltimore	9.50 (2)	8.00 – 8.50
New York Harbor	9.50	8.50
Philadelphia district	10.00 (2)	8.00 – 9.00
Boston	9.00 (2)	8.75 – 9.25
Providence	9.00 (1)	8.75 (2)

Pacific Export

(Quotations at seaboard, Los Angeles, cargo lots, except where otherwise noted.)

Prices Effective	Apr. 14	Apr. 7
375 e.p. blend, 70 oct.	5.625– 6.25	5.375– 5.625
390 e.p. blend, 68 oct.	5.50 – 5.75	5.125– 5.375
390 e.p. blend, 66 oct.	5.25 – 5.50	5.125– 5.375
400 e.p. blend, 65 oct. min.	5.125– 5.25	4.75 – 5.125
U. S. Motor, under 65 octane	4.75 – 5.00	4.625– 5.00
38-40 grav. w.w. kero., 150 fire point	4.50 – 5.00	4.50 – 5.00
41-43 grav., w.w. kero.	4.75 – 5.00	4.75 – 5.00
44 grav., w.w. kero.	5.00 – 5.50	5.00 – 5.50
Diesel fuel, 24 & above	$1.25 –$1.30	$1.25 –$1.30
Diesel fuel, under 24	$1.15 –$1.25	$1.15 –$1.25
30-34 grav. diesel (gas oil) Pac. Spec. 200	$1.25 –$1.35	$1.25 –$1.35
Grade C fuel, Pac. Spec. 400	$0.625–$0.75	$0.625–$0.75
In Ship's Bunkers, or deep tank lots:		
Diesel fuel, Pac. Spec. 200	$1.35 –$1.45	$1.35 –$1.45
Grade C fuel, Pac. Spec. 400	$0.70 –$0.75	$0.70 –$0.75

Pacific Export (Cont'd)

Prices Effective	Apr. 14	Apr. 7
Cased Goods: (Per case)		
U. S. Motor	$1.35 –$1.45	$1.35 –$1.45
375-400 e.p. blend, 65 oct. & above	$1.50 –$1.60	$1.50 –$1.60
400 e.p. blend, under 65 oct.	$1.40 –$1.50	$1.40 –$1.50
40-43 grav. w.w. kero., 150 fire point	$1.30 –$1.40	$1.30 –$1.40
Kero., p.w.	$1.25 –$1.35	$1.25 –$1.35

Tanker Rates

(Approximate rates. Cents per bbl.)

Gulf-N. Atlantic: (not E. of N.Y.)	Last Paid	Owners Ask
Hvy. Crude & Fuel (10 to 19.9 gravity)	57	..
Light Crude, (30 grav. or Lighter)	50	..
Gasoline	50	..
Kerosine	53	..
No. 2 Fuel	57	..

Gulf Coast

(Prices for sales made or firm offers reliably reported for sales pending in cargoes FOB ship at Gulf, for minimum of 20,000 bbls. Prices are by refiners only to other refiners, export agents, or to large tanker terminal operators at the customary trade specifications noted.)

Prices Effective Apr. 14

Motor Gasoline Domestic	
Min. 80 oct. '39 Research, max. 2cc lead	5.50 – 6.00
60-62, Gravity, Max. 400 e.p.	
72-74 oct. leaded (ASTM)	5.125– 5.75
70 oct. unleaded "	5.50 – 5.75
68 oct. " "	5.50
65 oct. " "	5.00 – 5.25
60 oct. " "	4.875– 5.00
41-43 w.w. kerosine	3.375– 3.75
No. 2 fuel	3.25 – 3.50
Gas Oil—Less than ½ of 1% sulfur.	
Below 43 diesel index	3.125– 3.25
43-47 " "	3.125– 3.375
48-52 " "	3.125– 3.375
53-57 " "	3.25 – 3.50
58 & above diesel index	3.625
Diesel Oil, ships' bunkers (ex-lighterage)	$1.45 –$1.50
Bunker C, " " "	$0.80 –$0.90
Bunker C, cargoes	$0.825–$0.875

Motor Gasoline Export	
60-62 Gravity, Max. 400 e.p.	
72-74 oct. leaded (ASTM)	5.125– 5.75
70 oct. unleaded "	5.50 – 5.75
68 oct. " "	5.50
65 oct. " "	5.00 – 5.25
60 oct. " "	4.875– 5.00
61-63 Gravity, Max. 390 e.p.	
72-74 oct. leaded (ASTM)	5.125
60 oct. unleaded "	....
64-66 Gravity, Max. 375 e.p.	
72-74 oct. leaded (ASTM)	5.125
60 oct. unleaded "	....
41-43 w.w. kerosine	....
Gas Oil—Less than ½ of 1% sulfur.	3.375– 3.75
Below 43 diesel index	3.125– 3.25
43-47 " "	3.125– 3.375
48-52 " "	3.125– 3.375
53-57 " "	3.25 – 3.50
58 & above diesel index	3.625

MID-CONTINENT LUBES

(At Gulf; in packages, FAS.; in bulk FOB terminals)

Apr. 14	New Steel Drums	Bulk
200 vis. D. 210 brt. stock	26.00–26.30 (2)	20.30 (2)
150 vis. D 210 brt. stock 0-10 p.p.	22.00–22.30 (2)	16.30 (2)
10-25 p.p.	21.80 (1)	15.80 (1)
100 vis. D 210 brt. stock 0-10 p.p.	21.80 (1)	15.80 (1)
10-25 p.p.	21.30 (1)	15.30 (1)
200 vis. No. 3 col. neutral: 0-10 p.p.	17.00 (1)	11.30 (1)

SOUTH TEXAS LUBES

(Vis. at 100°, c. t. 0, blk exprt. shp., FOB terminals)

Unfiltered Pale Oils: Vis. Color	Apr. 14	Apr. 7
100 No. 3	6.00 (2)	6.00 (2)
200 No. 3	7.50 (2)	7.50 (2)
300 No. 3	8.00 (2)	8.00 (2)
500 No. 3½	9.00 (2)	9.00 (2)
750 No. 4	9.50 (2)	9.50 (2)
1200 No. 4	10.00 (2)	10.00 (2)
2000 No. 4	10.25 (1)	10.25 (1)
Red Oils:		
Vis. Color		
100 No. 5-6	6.00 (1)	6.00 (1)
200 No. 5-6	7.50 (2)	7.50 (2)
300 No. 5-6	8.00 (2)	8.00 (2)
500 No. 5-6	9.00 (2)	9.00 (2)
750 No. 5-6	9.50 (2)	9.50 (2)
1200 No. 5-6	10.00 (2)	10.00 (2)
2000 No. 5-6	10.25 (2)	10.25 (2)

(a) 0.4c discount generally given for slabs loose.

TANK WAGON PRICES

Commercial or consumer tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1.5c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes where levied are indicated in footnotes. Dealer discounts are shown in footnotes. These prices in effect Apr. 14, 1941 as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. New Jersey

Esso (*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
*Atlantic City, N. J.	7.1	8.3	4.5	7.6
*Newark, N. J.	7.1	8.3	4.5	7.6
Annapolis, Md.	7.35	8.85	5.5	9.5
Baltimore, Md.	6.75	8.25	5.5	8
Cumberland, Md.	8.15	9.65	5.5	10
Washington, D. C.	7	8.5	3.5	9
Danville, Va.	7.95	10.45	6.5	9
Norfolk, Va.	6.75	9.25	6.5	9.5
Petersburg, Va.	7.05	9.55	6.5	10.5
Richmond, Va.	7.05	9.55	6.5	10.5
Roanoke, Va.	8.25	10.75	6.5	10
Charleston, W. Va.	7.55	10.05	6.5	11.5
Parkersburg, W. Va.	6.85	9.35	6.5	11.2
Wheeling, W. Va.	7.85	8.9	6.5	11.8
Charlotte, N. C.	8.9	9	7.5	9.8
Hickory	9.45	10.95	7.5	9.7
Mt. Airy, N. C.	9.3	8.5	7.5	10.4
Raleigh, N. C.	8.65	9.5	7.5	9.7
Salisbury, N. C.	8.95	8	7.5	10.1
Charleston, S. C.	6.75	9.25	7.5	....
Columbia, S. C.	7.6	10.1	7.5	....
Spartanburg, S. C.	8.3	10.8	7.5	....

	Mineral Spirits T.W.	V.M.&P. T.W.
Newark, N. J.	10.5	14.5
Baltimore, Md.	15	....
Washington, D. C.	15	....

Fuel Oils—T.W.	No. 1	No. 2	No. 3
Atlantic City, N. J.	7.4	6.2	6.2
Newark	7.4	6.2	6.2
Annapolis, Md.	...	6.5	...
Baltimore	...	6.5	6
Washington, D. C.	7.6	6.75	6.75
Norfolk, Va.	7	6	6
Petersburg	7.25	6.25	...
Richmond	7.25	6.25	6.25
Charlotte, N. C.	8.8	7.6	...
Hickory	...	7.25	...
Raleigh	8.7	7.3	...
Charleston, S. C.	...	6.3	...
Columbia	...	7.3	...
Spartanburg	...	8	...

*Effective April 10, '41, minimum retail resale price of 11.4c posted thru New Jersey.

Discounts:

Esso gasoline—to undivided dealers, 0.5c off dealer t.w. price, thru territory, except New Jersey. While above posted prices continue at Atlantic City and Newark, dealers will pay net price of 8.1c per gal. for Esso; dealers having pumps marked only Esso, Esso Extra and Standard White gasoline will pay 7.6c per gal. for Esso.

Kerosene—1c off t.w. price for 25 gals. or more, under contract thru territory (Baltimore city contract not necessary) except no discount in state of New Jersey.

Naphthas—To buyers taking following quantities at one time: Newark, 2c per gal. on 200 gals. or more, less than 200 gals. 0.5c higher price: Baltimore, 2c off on 25 to 100 gals. and 3c on over 100 gals.; Washington, 2c off to contract buyers.

Socony-Vacuum Oil Co., Inc.

Socony Mobilgas (*Regular Grade*)

	Com. T.C.	Com. Cons. T.W.	Undiv. Dlr. T.W.	Gasoline Taxes
New York City:				
Manhattan & Bronx	7.5	7.2	7.9	*5.5
Kings & Queens	7.5	7.2	7.9	*5.5
Richmond	7.5	7.2	7.5	5.5
Albany, N. Y.	8.4	8.1	8.6	5.5
Binghamton, N. Y.	8.8	8.5	9	5.5
Buffalo, N. Y.	8	7.7	8.2	5.5
Jamestown, N. Y.	8	7.7	8.2	5.5
Mt. Vernon, N. Y.	7.7	7.4	7.9	5.5
Plattsburg, N. Y.	9.4	9.1	9.6	5.5
Rochester, N. Y.	8.7	8.4	8.9	5.5
Syracuse, N. Y.	8.5	8.2	8.7	5.5
Bridgeport, Conn.	8.5	8.2	8.7	4.5
Danbury, Conn.	9	8.7	9.2	4.5
Hartford, Conn.	8.8	8.5	9	4.5
New Haven, Conn.	8.5	8.2	8.7	4.5
Bangor, Me.	8.4	8.1	9.4	5.5
Portland, Me.	8	7.7	9	5.5
Boston, Mass.	7.6	7.3	8.2	4.5
Concord, N. H.	9.9	9.6	10.1	5.5
Lancaster, N. H.	10.5	10.2	10.7	5.5
Manchester, N. H.	9.1	8.5	9	5.5
Providence, R. I.	7.6	7.6	8.7	4.5
Burlington, Vt.	9.4	9.1	9.6	5.5
Rutland, Vt.	9.5	9.2	9.7	5.5

	Mineral Spirits T.W.	V.M.&P. T.W.
Buffalo, N. Y.	9.6	10.3
†New York City	9	10
Rochester, N. Y.	10.5	11.2
Syracuse, N. Y.	11.3	....
Boston, Mass.	11	11
Bridgeport, Conn.	11.5	12
Hartford, Conn.	11	11.5
Providence, R. I.	11	12

	Kerosine Yard	Kerosine TW	Mobilfuel Diesel TC	Mobilfuel Diesel TW	Mobilheat Fuel Yard	Mobilheat Fuel TW
New York:						
Manhat'n & Bronx	...	7.5	....	6.8	...	6.3
Kings & Queens	5	7.5	....	6.8	4.7	6.3
Richmond	5.1	7.7	....	6.8	4.7	6.3
Albany	5.4	7.4	5.1	7.1	5.1	6.8
Binghamton	7	9	....	....	6.5	8
Buffalo	6.2	8	5.9	7.9	5.7	7.4
Jamestown	5.9	8	....	....	5.9	7
Mt. Vernon	5.2	7.7	....	7	4.6	6.2
Plattsburg	6	8	....	....	5.7	7.2
Rochester	6.6	8.6	....	....	6	7.5
Syracuse	6.5	8.5	....	....	6.2	7.7
Conn.:						
Bridgeport	5.5	7.3	....	....	5.1	6.2
Danbury	6	8.6	....	....	5.6	6.7
Hartford	5	7	....	6.7	4.7	6.5
New Haven	5.4	7.3	....	....	5.1	6.3
Maine:						
Bangor	5.8	7.7	....	....	5.5	7
Portland	5.6	7.7	5.3	7.3	5.3	6.8
Mass.:						
Boston	5.5	7.7	5.2	7.2	5.2	6.8
N. H.:						
Concord	6.3	8.3	....	....	6.3	7.8
Lancaster	7.4	9.4	....	....	7.3	8.8
Manchester	6.4	8.7	....	....	6	7.3
R. I.:						
Providence	5.5	7.5	5.2	7.2	5.2	6.7
Vermont:						
Burlington	6	8	....	....	5.6	7
Rutland	6.2	8.2	....	....	5.8	7.3

*Plus 2% city sales tax computed at time of each sale.

†Prices apply to consumers only in quantities over 1000 gals. annually; for quantities under 1000 gals. annually, add 0.5c per gal.

Discounts: Diesel—On t.w. deliveries, 0.5c for at least 400 gals.; 1c for full tank truck.

Atlantic Refining

Atlantic White Flash Gasoline (*Regular Grade*)

	Commercial T.C.	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Philadelphia, Pa.	7.5	8.5	5.5	9.5
Pittsburgh	7.5	9.5	5.5	10.5
Allentown	8	9.5	5.5	10.5
Erie	7	9.5	5.5	10
Scranton	8	9.5	5.5	10.5
Altoona	7.5	9.5	5.5	10.5
Emporium	7.5	9.5	5.5	10.5
Indiana	7.5	9.5	5.5	10.5
Uniontown	7.5	9.5	5.5	10.5
Harrisburg	8	9.5	5.5	10.5
Williamsport	8	9.5	5.5	10
Dover, Del.	...	9	5.5	10.5
Wilmington, Del.	...	8.5	5.5	10
Boston, Mass.	...	8.7	4.5	7.5
Springfield, Mass.	...	9.5	4.5	8.6
Worcester, Mass.	...	9.3	4.5	7.5
Fall River, Mass.	...	9.2	4.5	8.1
Hartford, Conn.	...	9.5	4.5	7.8
New Haven, Conn.	...	9.2	4.5	8.4
Providence, R. I.	...	9.2	4.5	8.1
Atlantic City, N. J.	...	8.1	4.5	7.4
Camden, N. J.	...	8.1	4.5	7.4
Trenton, N. J.	...	8.1	4.5	7.4
Annapolis, Md.	...	8.85	5.5	8
Baltimore, Md.	...	8.25	5.5	7
Hagerstown, Md.	...	9.35	5.5	7.6
Richmond, Va.	...	9.55	6.5	9.5
Wilmington, N. C.	...	9.35	7.5	9
Brunswick, Ga.	...	9	7.5	*9
Jacksonville, Fla.	...	8.5	8.5	10

	Mineral Spirits T.W.†	V.M.&P. T.W.†
Philadelphia, Pa.	12	14.5
Lancaster, Pa.	13.5	16
Pittsburgh, Pa.	14.5	14.5

Fuel Oils—T.W.	1	2	3	5	6
Phila., Pa.	7.5	6.5	6.5	4.25	3.50
Allentown, Pa.	8.5	7	7	....	....
Wilmington, Del.	8.00	6.5	6.5	....	....
Springfield, Mass.	8.6	6.4	6.4	....	....
Worcester, Mass.	7.5	7	7	....	....
Hartford, Conn.	7.8	6.2	6.2	....	....

*Does not include 1c Georgia kerosine tax.

†Mineral Spirits prices also apply to Stoddard Solvent; V.M.&P. prices also apply to Light Cleaners Naphtha.

Discounts:

Gasoline—to undivided dealers, 0.5c off dealer t.w., except Georgia & Florida dealer t.w. and undivided dealer t.w. prices are same.

Kerosine—Thru Penna. & Delaware, 2c off t.w. price on t.w. deliveries of 25 gals. or more at one time.

Naphthas—Philadelphia, 200 gals. or more at one time, 2c off. Lancaster, contract buyers taking 1000 gals. or more per year, one drum up, 2c off; non-contract buyers, 200 gals. or more at one time, 2c off. Pittsburgh, 500 gals. or more at one time, 2c off.

S. O. Ohio††

***Sohio X-70 Gasoline (*Regular Grade*)**

	Consumer T.W.	**Resellers	‡S.S.	Gasoline Taxes	†Kerosine T.W.
Ohio, Statewide	11	9	12.5	5.5	8.5
Akron	11	8	10	5.5	8.5
Cincinnati	11	8	10.5	5.5	8.5
Cleveland	11	8.5	11.5	5.5	8.5
Columbus	11	8.5	11.5	5.5	8.5
Dayton	11	7.5	10	5.5	8.5
Marietta	11	8.25	11	5.5	8.5
Portsmouth	11	8.5	11.5	5.5	8.5
Toledo	11	8	10.5	5.5	8.5
Youngstown	11	8.5	11.5	5.5	8

Aviation Gasoline—Statewide

	Consumer T.W.	Gasoline Taxes
Sohio Aviation	14.5	5.5
Esso Ethyl Aviation 74 Oct.	15.5	5.5
Esso Ethyl Aviation 80 Oct.	16.5	5.5
Esso Ethyl Aviation 87 Oct.	17.5	5.5
Esso Ethyl Aviation 90 Oct.	17.5	5.5
Esso Ethyl Aviation 100 Oct.	24.5	5.5

†Naphthas—T.W.

	Statewide	Lucas County
S. R. Solvent	12.75	12.75
D.C. Naphtha	13.25	13
V.M.&P. Naphtha	13.25	13
Varnolene	13.25	13
Sohio Solvent	13.25	13

Fuel Oils—T.W.	No. 1	No. 2	No. 3	No. 4
Ohio, Statewide	7.5	7.5	7	....
Cleveland	9.5	9.5	9.0	6.75

*Renown (third-grade) prices are same as X-70 unless otherwise noted.

**Except authorized agents.

†Kerosine prices are ex 1c state tax. Naphtha prices are ex 1.5c federal & 4c state tax.

‡Prices at company-operated stations.

††Statewide prices are subject to exceptions other than those shown.

Discounts:

Esso aviation—on contract to hangar operators and resellers, 2c off consumer t.w.

Fuel Oils—Statewide prices are for t.w. & drum deliveries of 50 gals. or more; prices for deliveries of less than 50 gals. are 0.5c higher. Cleveland Nos. 1, 2, and 3 prices are for bulk deliveries of 5 to 99 gals.; 100 gals. and over are 2c less. Cleveland No. 4 price is for full compartment hose dump only.

Naphthas—to contract consumers off t.w. prices—Statewide: 300 to 999 gals., 0.5c; 1000 to 2499 gals., 0.75c; 2500 to 4999 gals., 1c; 5000 or more gals., 1.5c. Lucas County: Less than 50 gals., tank wagon price; 50 to 249 gals., 0.5c; 250 to 499 gals., 1c; 500 gals. or over, 1.5c.

S. O. Kentucky

Crown Gasoline (*Regular*)
Standard (*Third Grade*)

	†Net Dealer Crown	Standard	Gasoline Taxes	Kerosine T.W.
Covington, Ky.	7.5	6.5	6.5	9
Lexington, Ky.	9.5	8	6.5	9
Louisville, Ky.	9	7.5	6.5	8.5
Paducah, Ky.	9.5	8.5	6.5	6.5
Jackson, Miss.	9	8	7.5	*8.5
Vicksburg, Miss.	8.5	7.5	7.5	*8
Birmingham, Ala.	8.5	7.5	*8.5	8
Mobile, Ala.	8	6.5	*9.5	8
Montgomery, Ala.	9	8	*9.5	*9
Atlanta, Ga.	9.5	8.5	7.5	*9
Augusta, Ga.	9.5	8.5	7.5	*8.5
Macon, Ga.	9.5	8.5	7.5	*8
Savannah, Ga.	8.5	7.5	7.5	*8
Jacksonville, Fla.	8.5	7.5	8.5	8
Miami, Fla.	8.5	7.5	8.5	8
Pensacola, Fla.	8	7	*9.5	8
Tampa, Fla.	8.5	7.5	8.5	8

*Taxes: In tax column are included these city and county gasoline taxes: Mobile, 2c city; Birmingham, 1c city; Montgomery, 1c city and 1c county; Pensacola, 1c city. Georgia and Montgomery, Ala. have 1c kerosine tax, Mississippi 0.5c, not included in above prices.

†Consumer t.w. prices are same as net dealer prices.

S. O. Indiana

Red Crown (*Regular Grade*)
Standard (*Third Grade*)

	Red Dealer Prices Crown Cons. T.W.	Red Crown	Stanolind	Gasoline Taxes	Kerosine T.W.
Chicago, Ill.	10.6	8.6	6.9	4.5	10
Decatur, Ill.	10.6	9.1	6.7	4.5	8.5
Joliet, Ill.	11.6	10.1	7.2	4.5	10
Peoria, Ill.	11.6	9.2	8.6	4.5	10
Quincy, Ill.	11.4	9.9	8	4.5	9.8
Indianapolis, Ind.	11.8	9.8	9.4	5.5	*10
Evansville, Ind.	11.6	9.4	8.5	5.5	*9.8

(Continued on next page)

TANK WAGON PRICES

Commercial or consumer tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1.5c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes where levied are indicated in footnotes. Dealer discounts are shown in footnotes. These prices in effect Apr. 14, 1941 as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. Indiana (Cont'd)

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown	Stanolind	Gasoline Taxes	Kerosine T.W.
South Bend, Ind	11.8	10.3	9.3	5.5	*10
Detroit, Mich.	10.1	8.6	7.6	4.5	8.1
Grand Rapids, Mich.	10.3	8.8	8.5	4.5	9.1
Saginaw, Mich.	10.9	9.4	8.9	4.5	9.1
Green Bay, Wis.	12.4	10.9	8	5.5	10.8
Milwaukee, Wis.	11.8	10.3	9.8	5.5	10.2
La Crosse, Wis.	12	10.5	10	5.5	10.4
Minneapolis-St. Paul	12	10.2	7.8	4.5	10.4
Duluth, Minn.	12.4	10.9	10.4	4.5	10.8
Mankato, Minn.	12	10.5	9	4.5	9.5
Des Moines, Ia.	11.4	9.9	8.4	4.5	*9.8
Davenport, Ia.	11.6	10.1	9.6	4.5	*10
Mason City, Ia.	11.8	10.3	7.8	4.5	*10.2
St. Louis, Mo.	10.7	9.2	7.5	*4.5	9.6
Kansas City, Mo.	10.9	7.9	6.9	*4.5	8.6
St. Joseph, Mo.	10.9	9	8	*4.5	8.4
Fargo, N. D.	13.2	11.7	9.5	5.5	11.6
Huron, S. D.	12.5	11	10.5	5.5	10.9
Wichita, Kans.	9.8	8.3	6	4.5	7.2

Stanavo Aviation 73 Octane

Chicago, Ill.	14.9	
Detroit, Mich.	16.5	4.5
Milwaukee, Wis.	15.1	5.5
Minneapolis, Minn.	15.3	4.5
St. Louis, Mo.	14.5	*4.5
Kansas City, Mo.	14.1	*4.5
Fargo, N. D.	16.5	5.5
Huron, S. D.	15.8	5.5

	Oleum Spirits	V.M.&P. Naphtha	Stanisol	*Taxes
(Prices are base prices before discounts)				
Chicago	12.7	13	12.4	4.5
Detroit	15.2	14.2	15.7	4.5
K. C., Mo.	12.9	13.9	13.4	1.5
St. Louis	13.2	14.2	12.4	1.5
Milwaukee	13.8	14.8	14.3	5.5
Minneap'ls	14	15	12.7	4.5

	Fuel Oils T.W. Standard Heater Oil Chicago:
1-99 gals.	8.75
100-149 gals.	7.75
150 gals. & over	7.25

	Stanolex No. 1	Stanolex Furnace Oil
1-99 gals.	8.25	8.25
100-399 gals.	7.25	7.25
400 gals. & over	6.75	6.75

	Stanolex Fuel Oil A	Stanolex Fuel Oil B
1-399 gals.	6	6
400-799 gals.	5	5
800 gals. & over	4.75	4.75

	Stanolex Bunker C Fuel Oil
1-999 gals.	4.75
1000 gals. & over	3.75

Other Points:	Stanolex No. 1	Stanolex Furnace Oil
Indianapolis		
1-99 gals.	...	*8.5
100 gals. & over	...	*7.5
Detroit		
1-99 gals.	...	7.8
100 gals. & over	...	7.8
Milwaukee		
1-99 gals.	9.2	8.7
100 gals. & over	8.2	7.7
Minneapolis		
1-99 gals.	8.2	8.2
100 gals. & over	...	7.2
100-199 gals.	7.7	...
200 gals. & over	7.2	...
St. Louis		
1-99 gals.	8	7.5
100 gals. & over	7	6.5
Kansas City		
1-49 gals.	7.8	...
50 gals. & over	6.8	...
1-99 gals.	...	7.8
100 gals. & over	...	6.8

*Taxes: In gasoline tax column are included these city taxes—Kansas City, St. Joseph, and St. Louis, 1c. Indiana kerosine and fuel oil prices are ex 4c state tax: Iowa kerosine prices are ex 3c state tax. In naphtha tax column are included 1.5c federal tax and state taxes.

†Prices for small-lot deliveries range up to 2c higher than above prices.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gasoline Taxes	Kerosine T.W.
Omaha	11.4	9.9	6.5	9.8
McCook	11	8.4	6.5	8.5
Norfolk	11.5	9.9	6.5	9.9
North Platte	11.8	10	6.5	10.2
Scottsbluff	11.4	9	6.5	9.5

S. O. Louisiana

Esso Gasoline (*Regular Grade*)

	Consumer Tank Car	Dealer T.w.	Gasoline Taxes	Kerosine T.W.
New Orleans, La.	5.75	8.25	8.5	*9
Baton Rouge, La.	6.25	8.75	8.5	*9.5
Alexandria, La.	6.25	8.75	8.5	*9.5
Lafayette, La.	6.5	9	8.5	*9
Lake Charles, La.	6.25	8.75	8.5	*9
Shreveport, La.	5.5	8	8.5	*9
Knoxville, Tenn.	9.5	11.5	8.5	12.5
Memphis, Tenn.	6.5	8.5	8.5	10.5
Chattanooga, Tenn.	9	8.85	8.5	11
Nashville, Tenn.	8.5	9	8.5	10
Bristol, Tenn.	9.75	9.75	8.5	12
Little Rock, Ark.	6.75	9.25	8	10

*Louisiana kerosine prices are ex 1c state tax.
Discounts:
Esso Gasoline—To individed dealers, 0.5c off dealer t.w.

Humble Oil & Refining Co.

Humble Motor Fuel (Regular Grade)
Thriftane (*Third Grade*)

	Humble *Tank Wagon	Humble Retail	Thriftane *Tank Wagon	Thriftane Retail	Gasoline Taxes
Dallas, Tex.	†6.5	9.5	†5.5	8	5.5
Ft. Worth, Tex.	6.5	10.5	5.5	8.5	5.5
Houston, Tex.	7.5	11.5	5.5	8.5	5.5
San Antonio, Tex.	7.5	11.5	5.5	8.5	5.5

	Kerosine *Tank Wagon	Kerosine Retail
Dallas, Tex.	6	10
Ft. Worth, Tex.	7	11
Houston, Tex.	8	11
San Antonio, Tex.	7	11

74 Oct. Aviation Gasoline, Clear	Tank Car
FOB Baytown, Tex.	8.5

*To all classes of dealers & consumers.

†Discounts to dealers only: Humble 1c; Thriftane 0.5c.

The Texas Co.

	Gasoline—Dealer Fire-Chief (*Regular*)	T.W. Indian (*3rd Grade*)	Gasoline Taxes
Dallas, Tex.	6.5	5.5	5.5
Ft. Worth, Tex.	6.5	5.5	5.5
Wichita Falls, Tex.	7.5	5.5	5.5
Amarillo, Tex.	7.5	5.5	5.5
Tyler, Tex.	7.5	5.5	5.5
El Paso, Tex.	9	8	5.5
San Angelo, Tex.	7.5	5.5	5.5
Waco, Tex.	7.5	5.5	5.5
Austin, Tex.	8	6	5.5
Houston, Tex.	8	6	5.5
San Antonio, Tex.	8	6	5.5
Port Arthur, Tex.	8	6	5.5

Continental Oil

	Conoco Bronz-z-z (*Regular*) †Tank Wagon	Demand (*3rd Grade*)	Gasoline Taxes	Kerosine T.W.
Denver, Col.	8.5	7.5	5.5	10.5
Grand Junction, Col.	12	11	5.5	12
Pueblo, Col.	8.5	7.5	5.5	9
Casper, Wyo.	11	10	5.5	11.5
Cheyenne, Wyo.	10	9	5.5	11
Billings, Mont.	11	10	6.5	12
Butte, Mont.	10	9	6.5	13
Great Falls, Mont.	10	9	6.5	12
Helena, Mont.	10	9	6.5	12.5
Salt Lake City, Utah.	11.5	10.5	5.5	14
Boise, Ida.	13.1	12.1	6.5	16
Twin Falls, Ida.	14.1	13.1	6.5	16.5
Albuquerque, N. M.	10	9	*7	9.5
Roswell, N. M.	8	7	*7	8
Santa Fe, N. M.	10	9	*7.5	9.5
Ft. Smith, Ark.	8	5.75	*5.5	6.5
Little Rock, Ark.	8	5.5	8	8
Texarkana, Ark.	8	6	*5.5	6
Muskogee, Okla.	7.5	6.5	5.5	7
Oklahoma City, Okla.	7	6.5	5.5	7
Tulsa, Okla.	8	7	5.5	7

*Taxes: In gasoline tax column are included these city taxes—Albuquerque, & Roswell, 0.5c; Santa Fe, 1c. Texas 1c state tax applies within city limits of Texarkana, Ark.; Okla. 4c state tax applies within city limits of Ft. Smith, Ark.

†To consumers & dealers.

Discounts: To dealers only — Cheyenne 1.5c on Bronz-z-z & Demand; Tulsa 1c on Bronz-z-z, 0.5c on Demand.

S. O. California

Standard Gasoline (*Regular Grade*)
Flight Gasoline (*Third Grade*)

	Standard Tank Truck	Standard Retail	Flight Tank Truck	Flight Retail	Gasoline Taxes
San Francisco, Cal.	12	13	10	11	4.5
Los Angeles, Cal.	11.5	12.5	9.5	10.5	4.5
Fresno, Cal.	13	14	11	12	4.5
Phoenix, Ariz.	14	15	11	12	6.5
Reno, Nev.	14	15	12	13	5.5
Portland, Ore.	12.5	13.5	10.5	11.5	6.5
Seattle, Wash.	12.5	13.5	10.5	11.5	6.5
Spokane, Wash.	14	15	12	13	6.5
Tacoma, Wash.	12.5	13.5	10.5	11.5	6.5

	Stanavo Tank Truck	Aviation Gasoline Taxes	Kerosine Tank Truck
San Francisco, Cal.	15.5	4.5	11.5
Los Angeles, Cal.	15	4.5	10
Fresno, Cal.	16.5	4.5	12.5
Phoenix, Ariz.	17.5	6.5	*12.5
Reno, Nev.	17.5	5.5	13.5
Portland, Ore.	16	6.5	13.5
Seattle, Wash.	16	6.5	13.5
Spokane, Wash.	19	6.5	16.5
Tacoma, Wash.	16	6.5	13.5

*Taxes: Phoenix kerosine price is ex 5c state tax.
Discounts:
To Resale & Commercial Consumers—3c off posted tank truck tax included price on Standard & Stanavo Aviation, 2c off on Flight. Deliveries less than 40 gals. to commercial consumer trade, 1c a gal. above posted tank truck tax included price, except single deliveries to Marine trade only which are billed at posted tank truck tax included price less 3c for Standard & Stanavo Aviation, and less 2c for Flight.
Kerosine—Tank car and truck & trailer deliveries, 3c off posted tank truck price; plant stem deliveries to jobbers, 2.5c off posted tank truck price.

Canada

PRICES OF IMPERIAL OIL LTD.

Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline (*Regular Grade*)

	Gasoline T.W.	Gasoline Taxes	Kerosine T.W.
Hamilton, Ont.	16.5	8	17
Toronto, Ont.	16.5	8	17
Brandon, Man.	21	7	23
Winnipeg, Man.	20.5	7	22.5
Regina, Sask.	18	7	20
Saskatoon, Sask.	20.8	7	22.8
Edmonton, Alta.	18.9	7	20.9
Calgary, Alta.	16	7	18
Vancouver, B. C.	16	7	23
Montreal, Que.	16	8	16.5
St. John, N. B.	14.50	10	18
Halifax, N. S.	14.50	10	18

Discounts: Gasoline—Maritime Provinces—undivided & divided dealers, t.w. price; British Columbia—undivided and divided dealers, 2c off t.w. price; balance of territory—undivided dealers, 1c off t.w. price, divided dealers, t.w. price.

Tank Wagon Price Changes

(These changes have been made in price tables)

S. O. New Jersey—Esso Gasoline:

Atlantic City & Newark prices up 0.2c to 0.5c Apr. 10.

S. O. New Jersey—Kerosine:

Atlantic City & Newark prices up 0.2c Apr. 11.

Socony-Vacuum—Mobilgas:

All prices up Apr. 9 in amounts ranging from 0.5c to 2.5c at Albany, Plattsburg, all Conn., Me., Mass., N. H., R. I., and Vt. points.

Atlantic Refining—White Flash Gasoline:

T. C. & T. W. up 0.5c Apr. 12 at Phila., Allentown, Scranton, Harrisburg, Williamsport, Dover & Wilmington, Del. T. W. up in amounts ranging from 0.5c to 0.9c Apr. 10 at Mass., Conn. & R. I. points. T. W. up 0.3c at N. J. points Apr. 11. Brunswick & Jacksonville t. w. up 0.5c Apr. 7.

S. O. Kentucky—Crown & Standard Gasolines:

Jackson, Miss. up 2c Mar. 27 & 0.5c Apr. 7. Prices up at other points in amounts ranging from 0.5c to 1.5c Apr. 7.

(*Continued on page* 46)

CRUDE OIL PRICES

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I. gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN & CENTRAL STATES FIELDS

PENNSYLVANIA GRADE

Posted by Jos. Seep Purch. Agency (Jan. 27, '41)

Bradford-Allegany $2.30
Southwest Penna $1.95
Eureka (West Va.) $1.89
Corning, O. (Apr. 1, '41) $1.17

Posted by Tide Water Assoc. Oil Co. (Jan. 27, '41)

Bradford-Allegany $2.30

Posted by The Pennzoil Co., (Jan. 27, '41)

National Transit $2.23*

Posted by Valvoline Pipe Lines (Jan. 27, 1941)

Bradford (Elk & McKean Counties, Pa.) $2.30
Warren, Forest, Venango, Clarion & Butler Counties, Pa. $2.23
Allegheny, Beaver, Washington & Greene Counties, Pa. $1.95
West Virginia $1.89
South Eastern Ohio $1.85

*Applies to Cochran, Franklin, Hamilton & Doolittle districts; prices in other lower districts range down to $2.18 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co. (April 1, '41)

Midland, Midland County $1.27
Sherman, Clare-Freeman $1.22

Posted by Simrall Corp. (April 1, '41)

Greendale, Porter, Vernon, Crystal & Wise $1.27
Buckeye, Bentley, Edenville, Beaverton & Monitor (sweet crude type) $1.25
Freeman, Redding, Lincoln & Winterfield $1.22
West Branch-Arenac $1.07
Hamilton-Grout $1.12

Posted by Sohio Corp. (Mich. Div.)

Traverse crude in Allegan, Kent, Ottawa & Van Buren Cos. (April 3, '41) $1.28
Trenton crude, Monroe Co. (April 3, '41) $1.22

Posted by Bay Pipe Line Corp. (April 1, '41)

Saginaw & Wise $1.27
Clare $0.96
Buckeye, Bentley & Kawkawlin $1.25
Adams $1.10

ILLINOIS-INDIANA-KENTUCKY-OHIO

Posted by Sohio Corp.

Illinois Basin, including Griffin pool (April 10, '41) $1.22
Carmi Storms, Ill. area (April 1, '41) 1.15
Birk City, Ky. area (April 1, '41) 1.15
Corydon, Ky. area, Henderson (April 1, '41) 1.15

Posted by Ohio Oil Co. (Apr. 7, '41)

Illinois Basin $1.22
Eastern Ill. & Western Ind. 1.07

Posted by Carter Oil Co. (April 1, '41)

Louden, Fayette Co. Ill. $1.22

Posted by Mohawk Oil Lines, Inc. (April 10, '41)

Southern Illinois $1.22

Posted by Ashland Oil & Transp. Co.

Somerset oil in Ash. Lines, Ky.: (Aug. 21, '40)

Big Sandy River $1.12
Kentucky River $1.20

Posted by Owensboro-Ashland Co.

Owensboro, Ky. area (April 1, '41) $1.15

Posted by S. O. Ohio (April 1, '41)

Lima, O. $1.05
Cleveland, Lodi & Chatham (O.) areas $1.10

MID-CONTINENT

OKLAHOMA-KANSAS-NORTH TEXAS

(See below for companies posting and dates)

Gravity	Schedule No. 1	Schedule No. 2	Schedule No. 3	Schedule No. 4	Schedule No. 5
Below 21	$0.75	$0.65	....	$0.60	$0.68
21-21.9	.77	.68	....	.63	.70
22-22.9	.79	.71	....	.66	.72
23-23.9	.81	.74	....	.69	.74
24-24.9	.83	.77	....	.72	.76
25-25.9	.85	.80	$0.63	.75	.78
26-26.9	.87	.83	.68	.78	.80
27-27.9	.89	.86	.73	.81	.82
28-28.9	.91	.89	.78	.84	.84
29-29.9	.93	.92	.83	.87	.86
30-30.9	.95	.95	.87	.90	.88
31-31.9	.97	.97	.91	.92	.90
32-32.9	.99	.99	.95	.94	.92
33-33.9	1.01	1.01	1.01	.96	.94
34-34.9	1.03	1.03	1.03	.98	.96
35-35.9	1.05	1.05	1.05	1.00	.98
36-36.9	1.07	1.07	1.07	1.02	1.00
37-37.9	1.09	1.09	1.09	1.04	1.02
38-38.9	1.11	1.11	1.11	1.06	1.04
39-39.9	1.13	1.13	1.13	1.08	1.06
40 & above	1.15	1.15	1.15	1.10	1.08

Above schedules posted by:

No. 1: S. O. Indiana April 1, '41 in Okla. & Kans. Continental Apr. 1, '41 in Okla. & Kans. with lowest grade Below 29 at $0.91.

No. 2: Carter & Magnolia Apr. 1, '41 in Okla. **Shell** Apr. 1, '41 n Okla. & Kans. (exclusive of Carter Co., Okla.)

No. 3: Sinclair-Prairie Apr. 1, '41 in Okla. & Kans.

No. 4: Shell Apr. 1, '41 in Carter Co., Okla.

No. 5: Stanolind Apr. 1, '41 in N. Texas. **Magnolia** Apr. 1, '41 in N. & N. Central Texas. **The Texas Co.** Mar. 29, '41 in N.-N. Central Texas. **Sinclair-Prairie** Apr. 1, '41 in Mexia & N. Central Texas. **Continental** Mar. 29, '41 in N. Texas. **Magnolia, Sinclair-Prairie, & Continental** schedules begin with Below 29 at $0.84. Texaco schedule begins with 28-28.9 at $0.84.

TEXAS & NEW MEXICO FIELDS

Posted by Humble Oil & Refining Co.—(March 29, 1941)

Gravity	Refugio	Texas Gulf Coast	Mirando	Anahuac	Dickinson	East Central Texas	West Central Texas	Panhandle, W. Texas & New Mex.	Hawkins Texas
Below 20	$0.98	$0.96	$0.93	$0.88	$0.83	....	....	$0.60	$0.73
20-20.9	1.00	.98	.95	.90	.85	....	....	.62	.75
21-21.9	1.02	1.00	.97	.92	.87	....	....	.64	.77
22-22.9	1.04	1.02	.99	.94	.89	....	....	.66	.79
23-23.9	1.06	1.04	1.01	.96	.91	....	....	.68	.81
24-24.9	1.08	1.06	1.03	.98	.93	....	....	.70	.83
25 & above	....	....	....	....	....	....	....	....	.85
25-25.9	1.10	1.08	1.05	1.00	.95	$0.87	$0.78	.72	....
26-26.9	1.12	1.10	1.07	1.02	.97	.89	.80	.74	....
27-27.9	1.14	1.12	1.09	1.04	.99	.91	.82	.76	....
28-28.9	1.16	1.14	1.11	1.06	1.01	.93	.84	.78	....
29-29.9	1.18	1.16	1.13	1.08	1.03	.95	.86	.80	....
30-30.9	1.20	1.18	1.15	1.10	1.05	.97	.88	.82	....
31-31.9	1.22	1.20	1.17	1.12	1.07	.99	.90	.84	....
32-32.9	1.24	1.22	1.19	1.14	1.09	1.01	.92	.86	....
33-33.9	1.26	1.24	1.21	1.16	1.11	1.03	.94	.88	....
34-34.9	1.28	1.26	1.23	1.18	1.13	1.05	.96	.90	....
35-35.9	1.30	1.28	1.25	1.20	1.15	1.07	.98	.92	....
36-36.9	1.32	1.30	1.27	1.22	1.17	1.09	1.00	.94	....
37-37.9	1.34	1.32	1.29	1.24	1.19	1.11	1.02	.96	....
38-38.9	1.36	1.34	1.31	1.26	1.21	1.13	1.04	.98	....
39-39.9	1.38	1.36	1.33	1.28	1.23	1.15	1.06	1.00	....
40 & above	1.40	1.38	1.35	1.30	1.25	1.17	1.08	1.02	....

Refugio: Includes crude purchased in East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth, Saxet, Taft, & Tom O'Connor fields.

Texas Gulf Coast: Includes crude purchased in Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa, Mykawa New, Raccoon Bend, South Thompsons, Sugarland, Thompsons, & Webster fields.

Mirando: Includes crude purchased in Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North & South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, & Tesoro fields.

Anahuac: Includes crude purchased in Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (Old & New), Pierce Junction, Red Fish Reef, & Turtle Bay fields.

Dickinson: Includes crude purchased in Dickinson, Gillock, Hardin, League City, & Rowan fields.

East Central Texas: Includes crude purchased in Anderson, Cherokee, Limestone, & Navarro Counties, and Navarro Crossing field.

West Central Texas: Includes crude purchased in Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, & Throckmorton Counties.

Panhandle, West Texas & New Mexico: Includes crude purchased in Carson, Gray, Hutchinson & Wheeler Counties; Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, & Yoakum Counties, Texas; Lea County, N. M.

Hawkins: Includes crude purchased in Hawkins Field, Wood County, Texas.

Conroe $1.33
Tomball 1.30
Van 0.98
Talco 0.72
East Texas & Flag Lake $1.15
Flour Bluff, E. Flour Bluff 1.23
Salt Flat, N. Salt Flat 1.04
Darst Creek, Hilbig, Carroll 1.04
Clark, Zoboroski $1.04
Alice, Benavides (N. Sweden), Sun 1.25
Ben Bolt, Clark-Muil, Tom Graham 1.25
Yates (Pecos) 0.85

MAGNOLIA PETROLEUM CO.

(April 1, '41)

Panhandle, Tex.—Same as Humble except Magnolia begins with Below 29 at $0.78.

West Texas—In Crane, Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum & Gaines Cos.—Same as Humble except Magnolia begins with Below 25 at $0.70.

N. Mexico—In Lea Co.—Same as Humble except Magnolia begins with Below 25 at $0.70 & ends with 36 & above at $0.94.

Cass & Panola Cos., Tex.—Below 25 at $0.78, plus 2c per degree of gravity to 40 & above at $1.10.

Mirando, Tex.—Same as Humble.

East Texas $1.15
Darst Creek 1.04
Luling ..... .95
Lytton Springs $1.07
Cleveland-Liberty Co. 1.16
Tomball 1.30
Talco ..... .72

SINCLAIR-PRAIRIE OIL MARKETING CO.

(April 1, '41)

West Texas, Texas Panhandle & Lea Co., N. M.—Same as Humble except Sinclair-Prairie begins with Below 25 at $0.70.

Texas Gulf Coast—Same as Humble.

East Texas $1.15
Eddy Co., N. M. ..... .84
Long Lake, Tex. $1.13

STANOLIND OIL PURCHASING CO.

(April 1, '41)

Clinton, Tex.—Same as Humble, Tex. Gulf Coast except Stanolind begins with Below 21 at $0.98.

Fairbanks, N. Houston & Rosslyn Tex.—Same as Humble Dickinson schedule.

E. Texas $1.15
Satsuma & Tomball, Tex. $1.30

STANOLIND OIL & GAS CO.

(April 1, '41)

W. Beaumont, Jefferson Co., Tex.—Same as Humble Tex. Gulf Coast.

Spindletop, Jefferson Co. & High Island, Galveston Co., Tex.—Same as Humble Tex. Gulf Coast except Stanolind begins with Below 21 at $0.98.

Hendrick & Henderson, Winkler Co., Tex.—Same as Humble Panhandle except Stanolind begins with Below 26 at $0.72.

THE TEXAS CO.

(March 29, '41)

Panhandle, Tex.—Same as Humble except Texaco begins with 34-34.9.

W. Texas & Lea Co., N. M.—Same as Humble except Texaco begins with 23 & below at $0.68 and ends with 36 & above at $0.94.

Texas Gulf Coast—Same as Humble except Texaco ends with 34 & above at $1.26.

Duval-Mirando, Tex.—Same as Humble Mirando except Texaco ends with 28-28.9 at $1.11.

Refugio, Tex.—Same as Humble except Texaco ends with 28-28.9 at $1.16.

East Texas $1.15
Darst Creek, Tex. 1.04
Hockley & Cochran Cos., Tex. ..... .77
Cass Co., Tex. $1.10
Conroe, Tex. 1.33

SHELL OIL CO., INC.

(March 29, '41)

West Texas & Lea Co., N. M.—Same as Humble except Shell ends with 36 & above at $0.94.

Fisher Co., Tex.—Same as Humble W. Central Texas except Shell begins with Below 25 at $0.76.

East Texas $1.15
Livingston area, Polk Co., Tex. 1.15
Pecos Co., Tex., except Yates Shallow pool $0.85
Pecos Co., Yates Shallow pool ..... .72

CONTINENTAL OIL CO.

(Mar. 29, '41)

Carson & Hutchinson Cos., Tex.—Same as Humble Panhandle except Continental begins with Below 29 at $0.78.

Mirando, Tex.—Same as Humble except Continental begins with Below 21 at $0.95.

Wade City, Tex.—Same as Humble Refugio except Continental begins with Below 21 at $1.00.

Clara Driscoll, Tex.—Same as Humble Refugio except Continental begins with Below 21 at $1.00 and ends with 30 & above at $1.20.

Alfred & Magnolia City, Tex., $1.15.

Eddy Co., N. M.—Below 29 at $0.68, plus 2c per degree of gravity up to 40 & above at $0.92.

PAN AMERICAN PIPE LINE CO.

(Apr. 1, '41)

Hastings & S. Houston, Tex.—Same as Humble Tex. Gulf Coast except Pan Am. begins with Below 21 at $0.98.

East Texas $1.15
Cayuga (Anderson, Freestone & Henderson Cos., Tex.) ..... .85

CRUDE OIL PRICES *(Continued from preceding page)*

CALIFORNIA *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective March 12, 1941

Gravity	Signal Hill (Long Beach) and others*	Seal Beach	Huntington Beach	Inglewood	Playa Del Rey	Olinda Brea Canon	Athens-Rosecrans	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal Wasco	Coles Levee	Mountain View and others**	Elk Hills, BuenaVista Hills, Midway-Sunset, Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge
14-14.9	$0.65	$0.64	$0.63	$0.64	$0.65	$0.61	....	$0.65	$0.61	$0.61	$0.62	$0.63	....	....	....	$0.65	$0.65	$0.65	$0.65	....
15-15.9	.65	.64	.63	.64	.65	.61	....	.65	.61	.61	.62	.63	....	....	....	.65	.65	.65	.65	....
16-16.9	.65	.64	.63	.64	.65	.61	....	.65	.61	.61	.62	.63	....	....	....	.65	.65	.65	.65	....
17-17.9	.65	.64	.63	.68	.65	.61	....	.65	.61	.61	.62	.63	....	....	....	.65	.65	.65	.65	....
18-18.9	.65	.64	.63	.71	.65	.65	....	.68	.61	.61	.62	.63	....	....	....	.65	.65	.65	.65	....
19-19.9	.69	.64	.67	.75	.70	.69	....	.72	.61	.65	.62	.63	....	....	....	.65	.65	.67	.65	$0.65
20-20.9	.73	.64	.72	.79	.76	.74	....	.75	.65	.69	.62	.67	....	....	....	.65	.69	.70	.65	.65
21-21.9	.78	.64	.76	.82	.81	.78	....	.79	.69	.73	.62	.72	$0.63	....	....	.65	.74	.74	.67	.65
22-22.9	.82	.69	.81	.86	.86	.82	....	.82	.73	.77	.66	.76	.63	....	....	.68	.79	.78	.70	.65
23-23.9	.86	.75	.85	.89	.92	.86	$0.71	.86	.78	.82	.71	.81	.67	....	....	.71	.84	.82	.74	.68
24-24.9	.90	.80	.90	.93	.97	.90	.77	.89	.82	.86	.75	.85	.72	....	....	.75	.89	.86	.78	.71
25-25.9	.95	.86	.94	.96	1.02	.95	.82	.93	.86	.90	.80	.89	.77	....	....	.79	.94	.90	.82	.75
26-26.9	.99	.91	.99	1.00	1.08	.99	.88	.96	.90	.94	.84	.94	.82	....	....	.83	.99	.95	.85	....
27-27.9	1.03	.97	1.03	1.04	....	1.03	.94	1.00	.94	.98	.89	.98	.87	$0.83	$0.92	.87	1.04	.99	.89	....
28-28.9	1.07	1.02	1.07	1.07	....	1.07	.99	1.03	.98	....	.93	1.02	.91	.86	.95	.91	1.09	1.03	.92	....
29-29.9	1.10	1.07	1.11	1.10	....	1.10	1.04	1.06	1.02	....	.98	1.06	.96	.89	.97	.95	1.14	1.07	.94	....
30-30.9	1.14	1.12	1.15	1.14	....	1.14	1.09	1.09	....	....	1.02	1.10	1.01	.92	.99	.99	1.19	1.11	.97	....
31-31.9	....	....	....	1.17	....	1.17	1.14	Elwood Terrace			1.07	1.14	1.05	.95	1.02	1.02	....	....	.99	....
32-32.9	Kettleman Hills			1.20	....	1.20	1.19	F. O. B. ship.			1.11	1.18	1.09	.98	1.04	1.06	....	....	1.02	....
33-33.9	....	$1.04	....	....	....	....	1.24	....	$1.13	....	1.15	1.22	1.14	1.01	1.07	....	....	....	1.04	....
34-34.9	....	1.08	....	....	....	....	1.29	....	1.16	....	1.20	1.26	1.19	1.04	1.09	....	....	....	1.07	....
35-35.9	....	1.12	....	....	....	....	1.34	....	1.19	....	1.24	....	1.23	1.07	1.12	....	....	....	....	....
36-36.9	....	1.15	....	....	....	....	1.39	....	....	....	1.28	....	1.27	1.10	1.14	....	....	....	....	....
37-37.9	....	1.19	....	....	....	....	1.44	....	....	....	1.33	....	1.31	1.13	1.16	....	....	....	....	....
38-38.9	....	....	....	....	....	....	1.49	....	....	....	1.37	....	1.36	1.16	1.19	....	....	....	....	....
39-39.9	....	....	....	....	....	....	1.54	....	....	....	1.42	....	....	1.19	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	1.59	....	....	....	1.46	....	....	....	....	....	....	....	....	....
41-41.9	....	....	....	....	....	....	....	....	....	....	1.50	....	....	....	....	....	....	....	....	....
42-42.9	....	....	....	....	....	....	....	....	....	....	1.54	....	....	....	....	....	....	....	....	....
43-43.9	....	....	....	....	....	....	....	....	....	....	1.59	....	....	....	....	....	....	....	....	....
44-44.9	....	....	....	....	....	....	....	....	....	....	1.63	....	....	....	....	....	....	....	....	....
45-45.9	....	....	....	....	....	....	....	....	....	....	1.67	....	....	....	....	....	....	....	....	....
46-46.9	....	....	....	....	....	....	....	....	....	....	1.71	....	....	....	....	....	....	....	....	....
47-47.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
48-48.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

FOB Standard Pipeline

*El Segundo prices same as Signal Hill. Wilmington prices same as Signal Hill, except below 19 gravity prices are: 14-16.9, $0.60; 17-17.9, $0.62; 18-18.9, $0.64.
**Includes Newhall, McKittrick, Kern River, Round Mountain and Kern Front, schedule for which ends with 19-19.9. Mountain View schedule begins with 19-19.9.

LOUISIANA-ARKANSAS

Posted by S. O. Louisiana, Apr. 1, '41

Gravity	Atlanta, Ark. et al.	Caddo, La. et al.	Rodessa, La. et al.	Bunkie, La. et al.	Darrow, La. et al.	University, La. (Baton Rouge)
40 & above	$0.98	$1.08	$1.10	$1.20	$1.20	....
39-39.9	.96	1.06	1.08	1.18	1.18	....
38-38.9	.94	1.04	1.06	1.16	1.16	....
37-37.9	.92	1.02	1.04	1.14	1.14	....
36-36.9	.90	1.00	1.02	1.12	1.12	....
35-35.9	.88	.98	1.00	1.10	1.10	....
35 & above	....	....	....	....	....	$1.26
34-34.9	.86	.96	.98	1.08	1.08	1.24
33-33.9	.84	.94	.96	1.06	1.06	1.22
32-32.9	.82	.92	.94	1.04	1.04	1.20
31-31.9	.80	.90	.92	1.02	1.02	1.18
30 & below	....	....	....	....	....	1.16
30-30.9	.78	.88	.90	1.00	1.00	....
29-29.9	.76	.86	.88	.98	.98	....
28-28.9	.74	.84	.86	.96	.96	....
27-27.9	.72	.82	.84	.94	.94	....
26-26.9	.70	.80	.82	.92	.92	....
25-25.9	.68	.78	.80	.90	.90	....
Below 25	....	.76	.78	.88	....	....
24-24.9	.66	....	....	....	.88	....
23-23.9	.64	....	....	....	.86	....
22-22.9	.62	....	....	....	.84	....
21-21.9	.60	....	....	....	.82	....
Below 21	.58	....	....	....	.80	....

Atlanta schedule includes Buckner, Magnolia, Village & Schuler (Jones Sand), Ark.

Caddo schedule includes De Soto, Sabine, Fouke, Homer, Miller Co., & Sugar Creek.

Rodessa schedule includes Cotton Valley & Shreveport (Cross Lake).

Bunkie schedule includes Eola & Olla.

Darrow schedule includes Bayou Mallet, Choctaw, Jeanerette, Lirette, N. & S. Crowley, Port Barre, Potash, Roanoke, & St. Martinville.

Big Creek, Dorcheat, McKamie Distillates (Sour) $1.05
Heavy Smackover Crude ..... .76
Cotton Valley Distillate 1.20
Cotton Valley (Holloway Sand Crude) 1.15

(Continued in next column)

LOUISIANA-ARKANSAS (Cont'd)

Posted by Shell Oil Co., Inc. (Apr. 1, '41)

Iowa District, Ia.

Below 18	$0.80	23-23.9	$0.94	29-29.9	$1.09	
18-18.9	.82	24-24.9	.97	30-30.9	1.11	
19-19.9	.84	25-25.9	1.00	31-31.9	1.13	
20-20.9	.86	26-26.9	1.03	32-32.9	1.15	
21-21.9	.88	27-27.9	1.05	33-33.9	1.17	
22-22.9	.91	28-28.9	1.07	34 & above	1.19	

Roanoke District, La.

Below 18	$0.75	23-23.9	$0.89	29-29.9	$1.04	
18-18.9	.77	24-24.9	.92	30-30.9	1.06	
19-19.9	.79	25-25.9	.95	31-31.9	1.08	
20-20.9	.81	26-26.9	.98	32-32.9	1.10	
21-21.9	.83	27-27.9	1.00	33-33.9	1.12	
22-22.9	.86	28-28.9	1.02	34 & above	1.14	

Black Bayou & White Castle Districts, La.—Same as Iowa District, except Black Bayou, etc. begins with Below 20 at $0.84.

Gibson field, Terrebonne Par., La. $1.09
Happytown field, St. Martin Par., La. 1.05

Posted by Arkansas Fuel Oil Corp.

Urania, La. (Apr. 1, '41) $1.05

Posted by Continental Oil Co. (Apr. 1, '41)

Tepetate, La. $1.08
Ville Platte, La. 1.10
Lake Arthur, La. 1.08

Abbeville, La.

Below 36	$0.97	37-37.9	$1.01	39-39.9	$1.05
36-36.9	.99	38-38.9	1.03	40 & above	1.07

CANADIAN FIELDS

Posted by Imperial Oil Limited
Western Ontario (Nov. 6, 1939)

Petrolia ..... $2.10 Oil Springs $2.17

Turner Valley Crude Oil (Sept. 12, '40)
(Prices FOB producer's tankage)

33-33.9	$1.08	44-44.9	$1.30	55-55.9	$1.52
34-34.9	1.10	45-45.9	1.32	56-56.9	1.54
35-35.9	1.12	46-46.9	1.34	57-57.9	1.56
36-36.9	1.14	47-47.9	1.36	58-58.9	1.58
37-37.9	1.16	48-48.9	1.38	59-59.9	1.60
38-38.9	1.18	49-49.9	1.40	60-60.9	1.62
39-39.9	1.20	50-50.9	1.42	61-61.9	1.64
40-40.9	1.22	51-51.9	1.44	62-62.9	1.66
41-41.9	1.24	52-52.9	1.46	63-63.9	1.68
42-42.9	1.26	53-53.9	1.48	64 & over	1.70
43-43.9	1.28	54-54.9	1.50		

Absorption Gasoline (Jan. 5, 1938)

90% Rec., 20 lb. Reid v.p. $1.94
90% Rec. 17 lb. Reid v.p. $2.08

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co. (Oct. 11, '38, except Tensleep Feb. 1, '41, and Frannie Light, Grass Creek Heavy, Hamilton Dome, & Iles Apr. 1, '41)

Salt Creek (except Tensleep crude), Midway & Dutton Creek, Wyo.

Below 29	$0.86	32-32.9	$0.94	36-36.9	$1.02
29-29.9	.88	33-33.9	.96	37-37.9	1.04
30-30.9	.90	34-34.9	.98	38-38.9	1.06
31-31.9	.92	35-35.9	1.00	39-39.9	1.08
				40 & above	1.10

Wyoming:		Wyoming:	
Tensleep Crude	$0.6515	Grass Creek Light	$0.90
Frannie Light	.65	Grass Creek Heavy	.45
Frannie Heavy	.42	Elk Basin	.90
Hamilton Dome	.40	Iles, Colo.	.97

Posted by S. O. Indiana (June 5, '39)

Lance Creek, Wyo. $0.77

Posted by Ohio Oil Co. (Oct. 11, '38)

Elk Basin, Wyo. $0.90
Grass Creek, Wyo. Light ..... .90
Rock Creek, Wyo. (April 1, '41) 1.05
Lance Creek, Wyo. (April 1, '41) ..... .82
Dry Creek, Mont. ..... .92
Sunburst, Mont. (Nov. 16, '37) ..... .90

Posted by Continental Oil Co. (April 1, '41) Ft. Collins & Wellington, Col.

Below 29	$0.86	32-32.9	$0.94	36-36.9	$1.02
29-29.9	.88	33-33.9	.96	37-37.9	1.04
30-30.9	.90	34-34.9	.98	38-38.9	1.06
31-31.9	.92	35-35.9	1.00	39-39.9	1.08
				40 & above	1.10

Canon City & Florence, Col. $0.95
Cat Creek, Mont. 1.15
Big Muddy, Wyo. $0.98
Lance Creek, Wyo. ..... .82

Tank Wagon Price Changes

(Continued from page 44)

S. O. Indiana—Stanolind Gasoline:
Correction: Apr. 5th advance at Mason City, Ia. was 0.9c to 7.8c, instead of 0.5c to 7.4c as reported in NPN of Apr. 9.

S. O. Nebraska—Red Crown Gasoline:
T. W. & Dealer prices up 0.5c at most points Apr. 5.

S. O. Louisiana—Esso Gasoline:
Little Rock t. w. up 0.75c Apr. 4.

The Texas Co.—Fire Chief & Indian Gasolines:
Austin, Houston, San Antonio, & Port Arthur up 0.5c Apr. 9.

Continental Oil—Bronz-z-z & Demand Gasolines:
Prices up 0.5c to 1c at most points Apr. 8

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Blackmer Pump Co. 36
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Brodie Co. Inc., Ralph N.
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Buckeye Iron & Brass Works
Butler Manufacturing Co.

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Crown Can Co.
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· PERSONALS ·

Preparations are under way by the Downtown Quarterbacks' Club to support the University of Tulsa's Golden Hurricane football team. Organized by Tulsa's leading sports fans, the club's new president this year is **R. W. McDowell,** vice president, Mid-Continent Petroleum Corp. **Mark Patton,** president of Hurley Gasoline Sales Co., is vice president of the sports group.

Howard E. Felt, Warren Petroleum Corp. vice president, and **R. B. Roark,** Shell Oil Corp. executive, will also assist in carrying out the club's program of stimulating interest in sports.

* * *

Elmo Thompson, Tulsa, executive vice-president of Sunray Oil Co., has been named to the board of trustees of the University of Tulsa. The university is known for its petroleum engineering courses.

* * *

Shown here before quarters at their new camp near Abilene, Tex., are **1st. Lieut. Thomas R. Parker,** Tulsa, of Skelly Oil Co.'s marketing department, and **1st. Lieut. Baird H. Markham, Jr.,** Tulsa, of Carter Oil Co.'s land department. Formerly stationed at Fort Sill, Okla., the 180th Infantry to which the two oil men are attached, was moved to Camp Barkley at the end of February. Lieut. Markham is the son of **General Baird Markham,** New York City, director of American Petroleum Industries Committee and at one time commanding general of the 45th Division when it was a unit of the National Guard.

Thomas R. Parker Baird Markham, Jr.

G. C. Howell

Honored for more than 15 years of continuous service, **Greydon C. Howell,** secretary and auditor of Seaside Oil Co., Santa Barbara, Calif., was recently presented a gold service pin along with 18 other Seaside employes whose years of service totalled 170. Eight of the employes received awards for 5 years of service; 7 for 10 years; and 4 for 15 years. In presenting the pins, **H. B. Kellogg,** vice-president and general manager, said, "We have made the awarding of service pins an important custom with our organization. Employes and management alike are aware of the mutual benefits of long and continuous service."

* * *

Harry Graham, traffic manager of the Standard Oil Co. of Louisiana for the past 5 years has been promoted to be assistant to Anson G. Phelps, traffic manager of Standard Oil Co. of New Jersey. **Sam B. Short** will succeed Mr. Graham as traffic manager at New Orleans. Mr. Graham was originally employed by New Jersey Standard in 1922 after 17 years of railroad experience. He later took charge of the general division of the Jersey company's traffic department, becoming traffic manager of Louisiana Standard in 1936.

* * *

Tulsa's needy school children will again receive aid from the Petroleum Charity Ball Assn. Composed of 4000 oil company employes, the group stages a grand ball each year, with proceeds used in the purchase of clothing for school children. **D. E. McCullough,** Darby Petroleum Corp., is the new chairman of the group and will supervise general arrangement for the big social affair. **Harold Durbin,** Warren Petroleum Corp., is vice chairman, with **O. J. Nelson,** Shell Petroleum Corp., treasurer and **Bernice Thompson,** Phillips Petroleum Co., secretary.

Armed with a set of golf clubs and sporting his favorite fishing rod, **Eugene M. Callis,** Philadelphia, president of the Petrol Corp., will set out shortly for Sea Island, Ga. He's bound for sunnier climes until the end of April.

* * *

F. C. Colegrove, for the past 5 years with Republic Oil Co. at Pittsburgh, left April 1 for Minneapolis where he joined Western Oil & Fuel Co.

* * *

Bequests of $10,000 each to Boys' Town, Nebraska, and to San Gabriel, California, charities, were included in the will of **Thomas J. Crumpton,** California pioneer oil man. During his long connection with the oil industry, Mr. Crumpton held executive positions with the Richfield Consolidated Oil Co., The Texas Co., and Superior Oil Co. He was also at one time a director of Emsco Derrick and Equipment Co.

* * *

D. E. Buchanan, Tulsa, president of Hanlon-Buchanan, Inc. and director of American Petroleum Institute, has been named chairman of the entertainment committee for the mid-year meeting of the A.P.I. in Tulsa May 19-22. Shown below is Mr. Buchanan astride his favorite horse. In the background is "Hiwan House" on his ranch near Evergreen, Colo.

D. E. Buchanan

Refining Technology

INCLUDING INTERNATIONAL PETROLEUM TECHNOLOGY

A.C.S. SHARPENS TOOLS

The Petroleum Division of the American Chemical Society held its semi-annual meeting last week, spending its efforts on sharpening the tools of the trade. It was purely a chemists' meeting this time and one in which a layman would have found it difficult to find significance. While the average oil man knows that it is necessary to know the physical and chemical properties of hydrocarbons, he is unprepared to explain the necessity for measuring refractive indices, interfacial tension, colorimetric determinations, and many others.

About the only fact that would interest him is that methods of determining these properties have been improved or speeded up. Probably the whole purpose of the symposium of analytical methods, which was the feature of the Petroleum Division's meetings, could be summed up in these same interests. This interchange of ideas is of value to the industry even though few real chemical problems of the industry were discussed.

The new Indiana oxidation test for lubricating oils as described by three Standard of Indiana chemists probably is one of the most interesting developments to those outside the fraternity of petroleum chemists. The petroleum chemical laboratories have been baffled to develop a test which would predict the oxidizing tendencies of lubricating oil in service and have turned to actual road tests, full-scale engine tests in engine laboratories, and even to small-scale engine tests as substitutes. The authors make no claim that their revised test does this with complete certainty but at least it does a better job than it did before being changed. Some of the facts reported about this new test are told on the following page.

Chemistry in exploration for petroleum is a recent development which is attracting the attention of petroleum chemists. One paper on this subject was presented and although it has no place in Refining Technology it can be read with considerable interest. This is a growing field for chemists and is a challenge to geophysical methods which have made the industry what it is today.

★ ★ ★

SENSE OF HUMOR VERSUS SAFETY

Some remarkable records have been made in refinery safety during the past five years. Man-hours per fatality and per disabling injury have run up to astronomical figures in some instances where concentrated effort has been made. Safety men have been concerned of late whether the awards of certificates, plaques, and prizes, which have been so successful in promoting safety, have now become so commonplace that they will soon lose their meaning and the pulling power.

If the peak in capacity for safe refinery operation has been reached, no safety engineer will admit it as long as new records are being made. Those leading the race can be sure of one thing: that it is a race that has no end and as long as there are contestants, records will continue to be broken.

It is a matter of justifiable pride with employes of Ashland Oil & Refining Co., Ashland, Ky., that it is now more than 440 days since the last lost time accident there in spite of a construction program during the past four months which added 100 men to the regular payroll in a particularly hazardous occupation.

The Ashland company's program is an informal one which takes advantage of employes' sense of humor as well as the universal love for a contest. Employes are divided into four groups, Alex. S. Chamberlain, personnel manager, writes. Each member of each group wears a celluloid button indicating the relative standing of the group in their safety contest. The top ranking group are "the berries", as plainly indicated on the buttons. The "all but" winners are "behind the 8-ball", which is the insignia of the second best group. Group 3 is considered a little slow and the members wear a button on which a turtle is pictured. White elephant buttons are worn by Group 4. Each month the buttons are traded around according to group standings.

Numerous other well-known devices are employed to recognize individuals. Considering the fact that marathon records are being beaten after hundreds of years of contests, it is not too much to hope that safety records will continue to be broken year after year.

★ ★ ★

BEYOND THE TEST TUBE

While chemists solve the practical problems of industry by looking to their test tubes, the most successful apparatus yet devised to explore the structure of matter continues to grow in size, number, power, and significance. This device is the cyclotron. It may never have any direct value in the future laboratory of an oil company but there is still conviction that this virgin field of endeavor will prove rich, according to the recent annual report of the Rockefeller Foundation.

So far it has taken many more dollars out of pocket than it has put back in but this did not stop the Foundation from appropriating over $1,000,000 to build another cyclotron at the University of California which will produce "the most powerful concentration of energy ever controlled by man." The beam of this giant, when completed, will penetrate 140 feet of air as compared with only 5 feet by the lagest built so far.

There are now 35 cyclotrons operating throughout the world varying in size from 500 pounds to 220 tons. The new cyclotron will contain over 4000 tons of steel and copper in its magnet alone. There are practical uses for this machine, however. One broad field has already been demonstrated, the report points out. Artificially radioactive atoms, known as "tagged atoms", are being used in laboratories in a wide range of basic research. An adventure in pure discovery is the motivating force behind further development of this scientific instrument, however, and the report concludes that "the real case for building this great cyclotron rests upon its ability to make accessible a new infinitesimal world—the interior of atomic nuclei, with all the possibilities of fresh knowledge that may there reside."

Motor Oil Oxidation Predictable By New Test, Chemists Are Told

ABSTRACT

A modification of the Indiana oxidation test enables closer correlation of test results with actual engine performance of motor oils. A stirring technique in imitation of crankshaft action is substituted for bubbling of air in test procedure. A symposium on analytical methods used in the petroleum industry includes also reports on tests showing temporary protective effects of oxidation products in preventing bearing seizure, an Ostwald-type viscometer for opaque liquids, improvements in determining unsaturates in gases containing feed stocks for polymerization and alkylation processes, methods of getting better accuracy in measuring heat of combustion, a method for correcting densities for temperature, and a method for detecting impurities from freezing and melting point curves.

THE Indiana "stirring" oxidation test, a modification of the well-known Indiana oxidation test, has been developed in the laboratories of Standard of Indiana to bring about closer correlation between laboratory tests and actual engine performance of lubricating oils, it was brought out in a paper by G. G. Lamb, C. M. Loane, and J. W. Gaynor of that company before the Petroleum Division of the American Chemical Society which met in St. Louis April 7-11.

The test involves rapid stirring of the oil at elevated temperatures in the presence of iron and copper catalysts in controlled amount and surface condition. The important feature of the test is that the volatile products of oxidation are retained in the oil much longer than in blowing tests and they therefore have greater influence on the oil deterioration. The test, with minor changes, was said to be applicable to the study of bearing corrosion and to the study of the oxidation stability of a wide variety of oils.

"The paper is not intended to bring forward a standardized or uniformly applicable laboratory test technique for the evaluation of oxidation stability of lubricating oils," the authors point out in conclusion. "Rather it means to emphasize the importance of a combination of several oxidation conditions which exist in engine operation, and which are believed to contribute largely toward the extent and nature of oil deterioration in the engine. It is believed that any successful laboratory test should provide for effective retention of volatile oxidation products and contact of these products with metallic catalyst, and that the stirring technique provides the most convenient method for obtaining this effect." The authors believe that the test variables can be selected so that the test will predict performance under a wide variety of engine conditions, although it is agreed that the only final evaluation of a crankcase oil is its performance in engines in actual service. It is also believed that the essential features of the test may be suitable for predicting performance of industrial oils, turbine oils, and other circulating oils.

The importance of laboratory tests suitable for predicting the oxidation stability of lubricating oils was stressed in the introduction of the paper. It was recalled that development of such tests have been numerous since the first widely used test was published by T. S. Sligh, Jr., in 1925. The authors found the general trend of opinion in the last several years to have minimized the value of laboratory oxidation tests and to be placing more emphasis on the full-scale engine test. They emphasize, however, that it remains so extremely important to have some simple and rapid method of predicting oil stability, especially in the development of improved oils, that the laboratory test has continued to receive a generous share of attention.

Examine Conditions Individually

In developing the Indiana oxidation test to a closer agreement with actual engine conditions, some of the more outstanding conditions involved in engine tests that would be expected to contribute to oil deterioration were examined one by one. Two specific objectives were sought in this study: to line up the control oil and the oil containing sulfurized additive so as to show the latter more stable towards deterioration, and to obtain a much more accelerated rate of deterioration of the control oil than is observed in the Indiana oxidation test.

One of the most striking conditions encountered in an engine is the presence of a large amount of metallic catalyst, including iron and copper. However, simply adding these metals to the test caused little of the desired improvement in test results.

In engine tests, a small part of the oil is continuously exposed in thin films on various parts of the piston and cylinder walls. Duplication of this condition did not cause appreciably accelerated deterioration of the oil, and did

Indiana Stirring Oxidation Tests

Effect of Change in Test Conditions on Deterioration of the Control Oil

Test Conditions: (Unless Otherwise specified) 500 cc. beaker, 250 cc. oil, 5 sq. in. Cu, 10 sq in. Fe, 1300 R.P.M., 330° F.

Oil	Change in Test Conditions	Saybolt Vis. 100° F. Seconds Incr. at Hrs. 48	Sludge —mg./10 g. at Hrs.— 24	48	72	Acidity mg. KOH/g. at Hrs. 24	48	72	Varnish Equivalent to Std. Rods at Hrs. 24	48	72
Oil A	No change	1210	356	958	. .	6.8	10.2	..	5	2	..
Oil A	Both metal catalysts omitted	160	0	0	0	0.8	1.0	1 1	10	10	10
Oil A	Copper omitted	135	0	34	40	0.8	1.7	2 8	10	7	4–5
Oil A	Iron omitted	1212	705	951	. . .	6.7	9.5	..	1	1	..
Oil A	Propellor pitch lowered from 40° to 20°	670	147	820	1140	2.8	6.7	10 4	5	2	..
Oil A	Stirring rate lowered to 760 R.P.M.	241	118	176	. . .	1.1	2 8	3.8	9–10	6-7	3
Oil A	Stirring rate raised to 1740 R.P.M.	2630	327	963	. . .	8.8	19.0	..	1	1	..

not show the compounded oil to be superior to the control oil. Exposure to high temperature as in the engine also produced no favorable change in test results.

Since aeration is obtained in the engine by beating the air into the oil through the action of the crankshaft and by further contact of air with the oil in the splash or forced feed lubrication system and not by blowing a stream of air through the oil as in the Indiana test, efforts were made to reproduce this condition more closely. As a first means of evaluating the importance of this factor, the volatile products escaping from the oil were returned to the oil but the test results still were unsatisfactory and similar to those obtained from the regular test.

It was observed, however, that when this type of test was run with copper wire in the condenser, the volatile products from the control oil attacked the copper, even at relatively low temperatures, causing formation of green copper soaps, whereas the oil containing the sulfurized inhibitor gave off appreciable hydrogen sulfide which coated the copper and prevented attack by the oxidation products. This explained the failure of the metallic catalysts to accelerate deterioration in the regular oxidation test. Blowing with air removed the volatile oxidation products before they had a chance to exert their effect.

Test Conditions

The test conditions for the new test are as follows: A sample of 240 cc. of oil is placed in a 500-cc. tall form beaker at 331° F. with a catalyst consisting of 5 sq. in. of copper and 10 sq. in. of iron. Aeration is provided by stirring at 1300 rpm. with a glass stirrer (2 blades, rounded, 2 cm. x 2 cm., at a 40° pitch).

In the new test four deterioration products of the oil are measured—the viscosity, sludge, acidity values, and varnish values, the latter was obtained from a suspended glass rod in the oil under test.

The authors concluded from theoretical considerations that "accelerated deterioration of an uninhibited oil in the Indiana Stirring Oxidation test is due mainly to the effective retention of volatile oxidation products which undergo secondary reactions in the presence of metallic catalysts to cause the formation of the conventionally measured deterioration products, such as sludge, varnish, etc." They believe that the volatile oxidation products are also retained to a large extent in crankcase oil as in the oil under test.

In applying the stirring test technique to the study of bearing corrosion it was found that the corrosion of copper-lead bearings did not proceed rapidly. In most cases, after a small amount of initial corrosion, the corrosion stopped entirely. The reason for this was assumed to be that in the case of the more stable oils only the lead was attacked, and that continued corrosion did not occur because only a very small amount of lead could easily contact the oil. In the low stability oils, sufficient corrosive products are formed to actually corrode the copper, in which case corrosion of the copper-lead bearings proceeds as is expected. Therefore, in most cases, the corrosion loss of lead strip has been measured rather than that of a copper-lead bearing. The test is believed to be useful not only in showing corrosion tendencies due to oxidation of the oil, but also to predict the slower corrosion caused by the corrosive nature of the additives themselves.

Oxidation Products Protective

Apparently certain of the initial oxidation products of the oil act as agents which delay incipient bearing seizure, probably by being strongly adsorbed on the bearing surfaces, it was brought out in a paper by Paul G. Exline, W. E. Kramer, and John R. Bowman, Gulf Research and Development Co. and Mellon Institute. These materials, however, may be unstable under the conditions of the experiment, and undergo change into less favorable bodies, or are rendered inactive in some manner, they found.

Although the gain in load carrying capacity with oxidation is most pronounced with slightly oxidized oils, the effect is observed in freshly refined ones. A marked gain in the response occurs with the initial precipitation of sludge in the sump. A minute lacquer film may form on the surfaces of the latter at that time, on which the favorable oxidation products may be more strongly adsorbed than on the clean metal.

The paper described a machine for the observation of the lubrication characteristics of oils during the course of their oxidation. It comprises a full cylindrical bearing one inch long and one inch in diameter which runs continuously at constant speed and constant temperature while varying load. The loading cycle begins at zero load and increases almost linearly with time to incipient seizure. At this point it is reduced back to zero very rapidly, and the cycle begins again automatically. Many loading cycles are recorded in the course of a test, and load and torque are continuously recorded. The oil system is built in such manner that it may be blanketed with any de-

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REFINING TECHNOLOGY

April 16, 1941

Closer correlation between laboratory tests for oxidation characteristics of motor fuel and behavior in engines on the road is obtained in new oxidation test procedure described before the Petroleum Division of the American Chemical Society R-114

Improvement in speed and cost of viscosity measurement is provided by further change in the glass capillary type of viscometer to speed up loading and cleaning R-121

All basic raw materials for synthetic rubber are potential petroleum derivatives. Since crude rubber import tonnage is 0.3% of crude oil production, plenty of basic raw material is available. Most synthetic rubbers are made from chemicals closely related to the fundamental rubber hydrocarbon, isoprene ... R-126

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sired atmosphere. Air and nitrogen are generally used alternately.

Effect is Temporary

Evidence was presented indicating that oxidation increases the incipient seizure load, i.e. the load-carrying capacity of the oil. The effect was found to be temporary, the seizure load decreasing to near its initial value shortly after the air is displaced with nitrogen. In the case of an oil containing an antioxidant, no such phenomena were observed.

The work was suggested by Dr. W. A. Gruse as the result of simliar work reported in proceedings of the Royal Society (London) and the journal of the Institute of Petroleum. Dr. Gruse suggested "that duplication of this work under carefully controlled conditions might give additional information on a question of major industrial importance as well as throw some light on the mechanism of oxidation of a lubricating oil". Several changes were made therefore in the test method and the machine constructed for the tests was made automatic in operation.

A run on an oil containing an anti-oxidant showed about what was to be expected. The seizure load began and remained low, irrespective of the atmosphere to which the oil was exposed. This run gave rather erratic data, the authors pointed out, and the results were difficult to explain. Following the test of a drastically "doped" oil, blank runs proved to be unsatisfactory, probably because of a change in the bearing surfaces. Further work with the machine is concerned with the effect of oxidation on the load carrying capacity of various oils, the influence of conditions on the effect, and the investigation of the nature of the effect itself.

Viscometer for Opaque Liquids

A modification of the Ostwald viscometer which was said to be particularly suitable for measuring the viscosity of opaque liquids was presented in a paper by M. R. Cannon and M. R. Fenske, Pennsylvania State College. This instrument is also valuable in obtaining rate of shear-shearing stress data which are of fundamental importance in investigations of plastic fluids and lubricating oils at low temperatures. A lubricating oil with a pour point of 0° F. may be either a plastic fluid or a true Newtonian liquid at this temperature. This instrument was said to be useful in determining the type of fluid and is of value in the study of effect of pour point depressors, dewaxing, etc., on the shearing rate-shearing stress relationship.

The instrument is similar to that described three years ago. Since it is designed for opaque liquids the efflux bulbs are at the bottom. When testing, the liquid flows from a reservoir up one side of the tube into three pear-shaped efflux bulbs on the bottom where the meniscus is

A.C.S. Petroleum Division Celebrates 20th Anniversary

The Division of Petroleum Chemistry of the American Chemical Society celebrated its 20th anniversary at the 101st annual meeting of the society in St. Louis last week. The manner in which the division was started was told in detail in the March 10 News Edition.

Ralph R. Matthews, Battenfeld Grease & Oil Corp., was given credit for suggesting to the society that such a division would be desirable. This letter of suggestion was written in 1918. The idea did not get much attention until the Spring meeting in 1920 when a survey of members was proposed and Matthews stirred up more action. The response to a questionnaire sent to prospective members of such a division was so gratifying that plans were made for an organization meeting at the Spring meeting of the society in 1921.

Thirty charter members gave the division its start at this meeting. Their names are well known in petroleum circles and are given below:

Adkins, L. R.*
Anderson, R. P.
Bacon, R. F.
Barnard, D. P.
Baxter, F. R.
Born, Sidney
Boyd, T. A.
Brooks, B. T.
Clay, G. Harry
Dean, E. W.
Delbridge, T. G.
Emmons, C. E.
Faragher, W. F.
French, D. K.
Garner, F. H.
Gruse, W. A.
Hamor, W. A.
Lane, F. W.
Mabery, C. F.*
Lockhart, L. B.
Manning, Van H.*
Matthews, R. R.
Midgley, Thomas, Jr.
Palmer, C. S.*
Parish, W. F.*
Parsons, L. W.
Smith, N. A. C.
Wagner, C. R.
Waters, C. E.
Wilson, R. E.

*Deceased.

The program of the first meeting was arranged by the co-operation of all under the direction of W. A. Gruse, Mellon Institute, who later became the first secretary of the division. T. G. Delbridge acted as temporary chairman at the meeting and then was selected as chairman of the division. Actually the group did not become known as a division until the Spring meeting in 1922. Membership climbed by 1929 to 355, dropped to 276 in 1932, and then climbed again to 660 members by the summer of 1940.

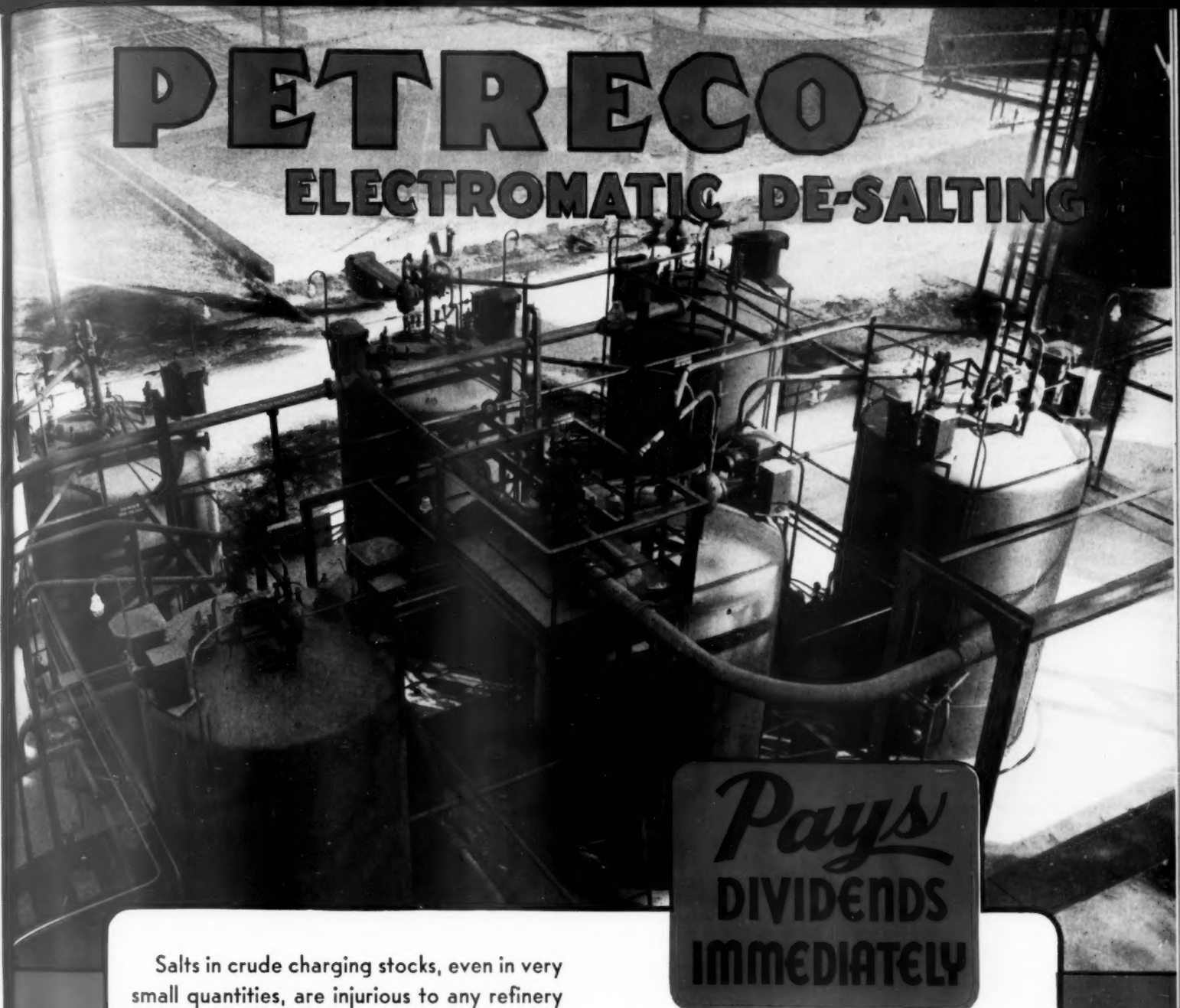
The chairmanship was held after Dr. Delbridge by Ralph R. Matthews, J. Bennett Hill, C. R. Wagner, F. W. Sullivan, Jr., F. W. Hall, J. C. Morrell, P. K. Frolich, and now by J. K. Roberts. The office of secretary-treasurer was held after Dr. Gruse by G. A. Burrell, C. L. Johnson, C. R. Wagner, C. D. Lowry, Jr., F. L. Koethen, and C. R. Wagner again, who has been retained by the division in one office or the other since 1929.

Considerable credit is given to Dr. Gruse in the launching and progress of the division, which has become one of the largest and most active divisions of the society, and also to Dr. Wagner, whose efforts and interest in improvement of programs and service to division members has resulted in the rapid growth of the past decade.

J. K. Roberts, present chairman of the Division of Petroleum Chemistry, American Chemical Society, is director of research, Standard Oil Co. (Ind.)

C. R. Wagner, secretary-treasurer, A.C.S. Petroleum Division, is chief chemist, The Pure Oil Co.

M. R. Fenske, vice chairman, A.C.S. Petroleum Division, has done outstanding work in petroleum chemistry at Pennsylvania State College



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always in contact with clean unwetted glass and can be seen. The precision of measurements with this instrument when measuring viscosities of opaque liquids was said to be ± 0.2%. They can be constructed to cover any desired viscosity range by calculating the diameter of the capillary.

The instrument takes a charge of approximately 13 cc. but the dimensions can be changed to require only 5 cc. This instrument is believed by the authors to be simpler in design and less expensive than one described last year by Anderson Wright and Griffin.

Unsaturates in Gases

Some improvements in methods for determining unsaturates in hydrocarbon gases were described in a paper by R. F. Robey, C. E. Morrell, and B. M. Vanderbilt, Standard Oil Development Co. The authors point out that many of the methods in use today are old and although procedures have been improved from time to time, some of them are inherently inaccurate. Improvements in petroleum refining processes and introduction of new processes, such as polymerization and alkylation, which utilize olefinic compounds, have focused attention upon the need for still greater accuracy.

Recent trends have been toward more selective methods as well as better accuracy, they indicated. Their paper was, therefore, a report of some improvements in the hydrogenation method for determining unsaturates in gaseous hydrocarbon mixtures, and pointed out some precautions in determining the gaseous diolefins by absorption in maleic anhydride.

This method was developed by MacMillan and described in the Analytical Edition of Industrial and Engineering Chemistry in 1936 (Vol. 8, page 105) but was found to be inaccurate under certain conditions. This is because the lower hydrocarbons do not behave as ideal gases, either when alone or in admixture with hydrogen, it was stated. Corrections for this effect were derived by the authors and presented with their paper in graphic form along with experimental confirmation.

The authors' experience with the method showed it to be satisfactory from the chemical standpoint, i.e., the reaction involved is complete, free from side reactions, and sufficiently rapid so that a reasonable number of passes suffices to give a good end point. Also, the catalyst appeared to be easily saturated with gas and produced no interfering effects. From a purely physical aspect, however, it is apparent that the method, as originally described, is based on the assumption that the lower hydrocarbons are ideal gases, they point out. Corrections were suggested which permit the final results to be expressed in mole per cent unsaturation, which is defined as the number of moles of hydrogen which will combine (under the conditions of the analysis) with 100 moles of hydrocarbon sample.

The method was accurate when employed on hydrocarbon fractions containing less than 30 mole per cent unsaturates, but samples containing higher amounts of olefinic and diolefinic hydrocarbons give considerable deviation. This was found to be particularly true of the gaseous olefins containing four carbon atoms, e.g. isobutylene, the normal butylenes and butadiene. Deviation of a gas from ideal gas behavior is expressed in terms of compressibility values.

Deviation of Corrections

The authors discussed the derivation of corrections for the butane-butylene fraction, ethane-ethylene, and other fractions. For the determination of conjugated diolefins (mainly butadiene) in gas samples, molten maleic anhydride is probably the most specific absorbent known to date, they found. However, in the presence of 10% or more of isobutylene, serious errors were experienced, apparently due to slow reaction of isobutylene with the absorbent. A study of this anomaly resulted in demonstrating that the addition of 2-3% of a high-boiling primary or secondary amine to ordinary C.P. maleic anhydride before use in the analysis is sufficient to reduce the reaction of isobutylene, even in 100% concentration, to less than 0.1% per pass. Di-n-amyl amine was found satisfactory for this purpose, its addition apparently reducing the acidity sufficiently to practically eliminate the polymerization.

Absorption by molten maleic anhydride may also be applied to blends of the pentane-amylene fraction of hydrocarbons in hydrogen or nitrogen for the determination of the conjugated diolefins, isoprene and cyclopentadiene. As in the case of the butane-butylene fraction, the introduction of amine in the maleic anhydride absorbent is necessary to inhibit the reaction of tertiary olefins, particularly trimethylethylene. A correction for gas imperfection is also required. In attempting to check the correction values by the preparation and analysis of highly purified samples of isoprene and piperylene, it was observed that while the reaction of isoprene is virtually quantitative, that of piperylene falls short by considerable percentages in highly purified samples from two different sources. This has been ascribed to the slow and incomplete reaction of one geometrical isomer.

Heat of Combustion

The increasing importance of heat of combustion measurements in petroleum analytical work has made desirable the critical examination of the adiabatic bomb calorimeter method used for testing gasoline samples, it was pointed out by W. H. Jones and C. E. Starr, Jr., Standard Oil Co. of Louisiana, in a joint paper. It was believed that there might be errors which would not be encountered in less volatile liquid or solid samples.

They showed that by rigid control of several factors, the usual accuracy of ± 100 Btu. per pound may be improved so that ± 30 Btu. per pound may be readily attained. The authors found it necessary to establish a tolerance of ± 0.1 mg. in the weights of sample and capsule, a tolerance of ± 0.1 gram in the weight of the calorimeter water, and a tolerance of ± 0.001° C. in the thermometer (bucket) reading. It was recommended further that a sensitive galvanometer be used on the thermocouple circuit so that the analysis can control the jacket temperature to within 0.1° C. of the bucket temperature during the temperature rise following ignition of the sample. When obtaining the water equivalent of the calorimeter, by burning standardized benzoic acid, the amount of the sample should be chosen such that the temperature rise obtained will approximate the temperature rise that results subsequently when analyzing the gasoline samples.

Reproducibility of results was demonstrated by data for 25 determinations made on a sample of n-heptane which were checked with National Bureau of Standards. The authors also offered a correlation curve to yield reasonable values from other data which may be more readily obtainable, for laboratories not equipped to make this test.

Temperature Correction for Density

M. R. Lipkin and S. S. Kurtz, Jr., Sun Oil Co., proposed a method of correcting densities with change of temperature. Using the equation:

$$d_t^t = d_t^{20} + \alpha\ (t - 20) + \beta\ (t - 20)^2$$

a single curve of α versus molecular weight and a single curve of β versus molecular weight has been found applicable to all types of hydrocarbons with very few exceptions. From these curves the temperature coefficient of density can be predicted from the molecular weight within ± 0.00002 g./cc./°C. or better. The only definite exceptions to this relation are benzene, pentaethyl benzene, and hexapropyl benzene which show coefficients .00010 g./cc./°C. higher than the predicted values, the author pointed out.

The problem in using this formula has been to correlate α and β with other properties so that they can be predicted. It was pointed out that the National Standard Petroleum Oil Tables used in the petroleum industry for correcting the specific gravity of oils for temperature change are based on a single curve of α versus density, and a single curve of β versus density. Since each hydro-

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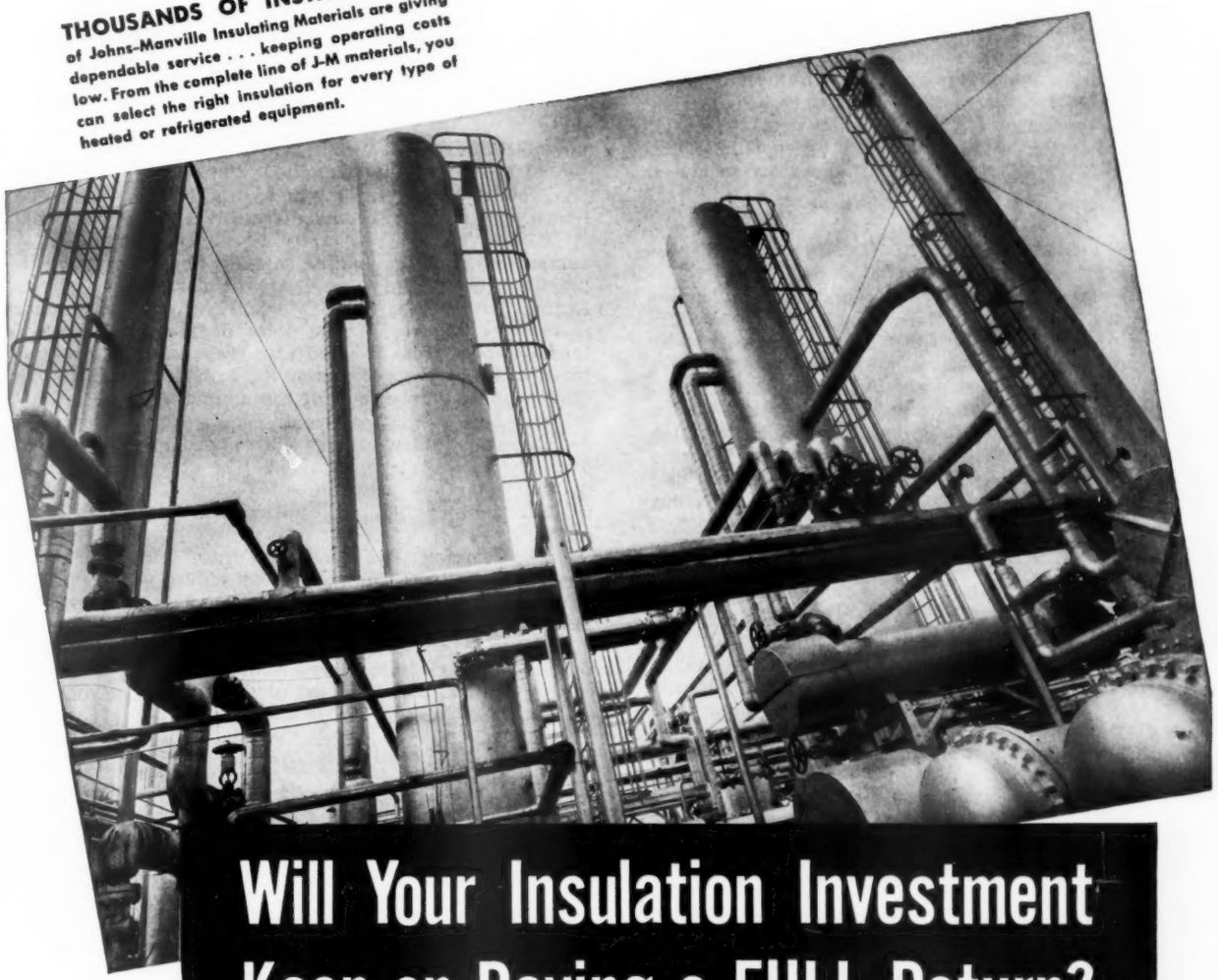

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carbon type has a curve of its own, the accuracy of a single curve for hydrocarbon mixture is dependent on composition. The authors expanded a correlation developed by Calingaert, Beatty, Kuder, and Thomson, between α and β the number of carbon atoms for the normal and branched paraffins up to 20 carbon atoms. This provides a single correlation which applies to all data now available including compounds of high molecular weight. The derivation of the general relation between molecular weight and these coefficients was said to be simple and the plot of smoothed values against densities produced straight lines.

Detection of Impurities

Simple time-temperature freezing and melting curves were analyzed by B. J. Mair, A. R. Glasgow, Jr., and F. D. Rossini, National Bureau of Standards, who outlined a procedure for determining the freezing point of a given substance and the amount of impurity in it. The procedure was applied to a number of different known solutions of hydrocarbons ranging from 0.006 to 0.115 mole fraction in concentration of solute. For the systems examined, it was found that the values for the freezing point obtained from both freezing and melting point curves were always in accord within their respective limits of uncertainty, and that the estimated amounts of impurity were in satisfactory accord with the amounts known to be present, the estimated amount being in error by not more than about 10% of itself on the average.

A new method for determining the amount of impurity in a given "pure" substance, referred to above, is that recently developed by Schwab and Wichers at the Bureau. This method was reported over a year ago in a symposium on temperature sponsored by the American Institute of Physics and is published in a book record of the symposium. It is a differential time-temperature freezing method involving observations on the given substance followed by duplicate observations on the same material plus a known amount of impurity. This differential method was said to minimize the experimental sources of error inherent in the simple method of making time-temperature observations only on the given substance, is well suited to the precise determination of small amounts of impurity, and has been satisfactorily tested on preparations of benzoic acid having amounts of impurity as low as 0.00001 mole fraction. The method cannot be used, however, in those cases where it is necessary to retain the material under investigation in its original state of purity. This latter requirement is important in the case of hydrocarbon compounds of high purity, which are usually available only in very limited quantities.

Adiabatic Fractionator

A new laboratory fractionating column producing results for which no direct explanation has been found in the classic fractional distillation heat and material balance theory, was described by Walter J. Podbielniak, president of Podbielniak Centrifugal Super-Contactor Co., Chicago.

The design was described as being fully adiabatic and employs precision spaced capillary film principle wire packing. It may be used in the temperature range of −180° to 300° C. (−292° to 572° F.). Vacuum-jacketing surrounds the column, flask, reflux head and all connections and means are provided for compensating residual heat leakage through the jacketing. New vacuum-jacketed standard taper ground joints make a four-part assembly possible and the apparatus remains tight at extreme temperatures.

The packing has tested as high as 75 plates in 14 inches with *n*-heptane and methylcyclohexane, maintaining efficiency at least up to 13 mm. diameter, Mr. Podbielniak said.

* * *

The ring method for determining interfacial tension is discussed by H. H. Zuidema and G. W. Waters, Shell Oil Co., in a paper which extends the corrections of Harkins and Jordan. These correction tables were found inadequate except for the cases of very low scale readings and great differences between the densities of the two phases. To handle the cases most generally met in the measurement of interfacial tension at hydrocarbon-water interfaces, it was found necessary to extend the correction data considerably. The newly established relation was checked, using two independent instruments. Values found on nine different oils were found to agree with those obtained by the capillary method, the authors concluded.

New developments in the synthesis of saturated liquid hydrocarbons were reported by Dr. K. N. Campbell and L. T. Eby of the University of Notre Dame. They developed methods for making some of the unsaturated (more reactive) petroleum type hydrocarbons in two structural forms. Hitherto only two well authenticated cases of such pairs were known. These pairs of forms are called cis-trans isomers from the fact that they have the same structures in every respect except for a difference in the three-dimensional arrangement of the atoms.

One member of each pair was made by treatment of derivatives of acetylene gas with hydrogen in the presence of finely divided nickel catalyst. The other form was made by a new method using liquefied ammonia gas to dissolve the acetylene compounds, and metallic sodium as reducing agent.

The two forms of each pair presented a marked similarity in many of their properties, but were sufficiently different in some respects for the chemists to identify them as distinctly different substances. Now that compounds of this type are available, and their properties recorded, they may be valuable as reference substances in the study of the fundamental behavior of the large class of unsaturated hydrocarbons.

New Patents

NEW PATENTS

Compiled by R. E. Burnham, patent and trade-mark attorney, 511 Eleventh Street, NW, Washington, D. C., from whom copies may be obtained at rate of 25c each. State number of patent and name of inventor when ordering.

February 25, 1941

Fractionation of oils—G. L. Parkhurst, assignor to Standard Oil Co. (Ind.) Filed Feb. 25, 1932. No. 2,232,722.

Process for treatment of hydrocarbons—W. A. Schulze, assignor to Phillips Petroleum Co. Filed Oct. 20, 1936. No. 2,232,736.

Process for treatment of petroleum distillates—J. H. Balthis, Jr., assignor to E. I. du Pont de Nemours & Co. Filed Sept. 21, 1938. No. 2,232,761.

Hydrogenation process—E. J. Gohr, assignor to Standard-I. G. Co. Filed June 20, 1939. No. 2,232,909.

Process for desulfurizing hydrocarbon oils—E. H. Records and J. E. Louttit, Tacoma, Wash. Filed June 6, 1939. No. 2,232,971.

Manufacture of gasoline—R. D. Pinkerton, and William Mendius, assignors to Sinclair Refining Co. Filed Oct. 19, 1939. No. 2,233,144.

Process for producing paraffinic oils—F. E. Frey, P. V. McKinney, and W. H. Wood, assignors to Phillips Petroleum Co. Filed June 27, 1936. No. 2,233,363.

Lubricating oil addition product and method of making—A. E. Robertson, assignor to Standard Oil Development Co. Filed May 4, 1938. No. 2,232,868.

Concentration of olefins—R. F. Robey, assignor to Standard Oil Development Co. Filed Dec. 30, 1938. No. 2,232,869.

Chemical process—A. D. Green, and W. W. Waterman, assignors to Standard Oil Development Co. Filed July 27, 1939. No. 2,232,910.

Lubricating oil—M. T. Flexman, assignor to Union Oil Co. (Calif.) Filed May 3, 1938. No. 2,233,203.

Manufacture of hydrocarbon resins—C. A. Thomas, assignor to Monsanto Chemical Co. Filed June 1, 1935. No. 2,234,660.

Lubricating oil—S. E. Jolly, assignor to Sun Oil Co. Filed Oct. 11, 1939. No. 2,234,915.

Method of synthesizing hydrocarbons—P. C. Keith, Jr., Peapack, N. J. Filed May 18, 1938. No. 2,234,941.

March 4, 1941

Process for producing low boiling hydrocarbons—Morris Levine, Pampa, Tex., assignor to Danciger Oil & Refineries, Inc., Tulsa, Okla. Filed Apr. 8, 1937. No. 2,233,951.

Lubricant—J. G. McNab, assignor to Standard Oil Development Co. Filed Oct. 14, 1938. No. 2,233,426.

Lubricant—W. L. Steiner, assignor to Lubri-Zol Development Corp. Filed Jan. 22, 1940. No. 2,233,436.

Lubricant—W. A. Smith, Hamburg, N. Y. Filed Aug. 9, 1935. No. 2,233,683.

Diesel engine lubricant—C. M. Loane and B. H. Shoemaker, Hammond, Ind., assignors to Standard Oil Co. (Ind.) Filed Oct. 11, 1937. No. 2,234,005.

Lubricating oil—J. W. Teter and F. M. Watkins, assignors to Sinclair Refining Co. Filed Jan. 28, 1939. No. 2,234,096.

Oil reclaiming apparatus—P. J. Doyle, Cleveland. Filed Aug. 14, 1939. No. 2,234,111.

Speeds Viscosity Measurement In Capillary Type Viscometer

By E. H. Zeitfuchs*

ABSTRACT

Improvement in speed and cost of accurate determination of viscosity of refined oils is provided by further simplification of the glass capillary type of kinematic viscometer. In the newly designed instrument the trap is placed at the lower end of the viscometer rather than the upper end, thus simplifying and speeding up its loading and cleaning. Range of the instrument is 1.0 to 1000 centistokes or up to 4500 S.U.S., but may be made for other ranges.

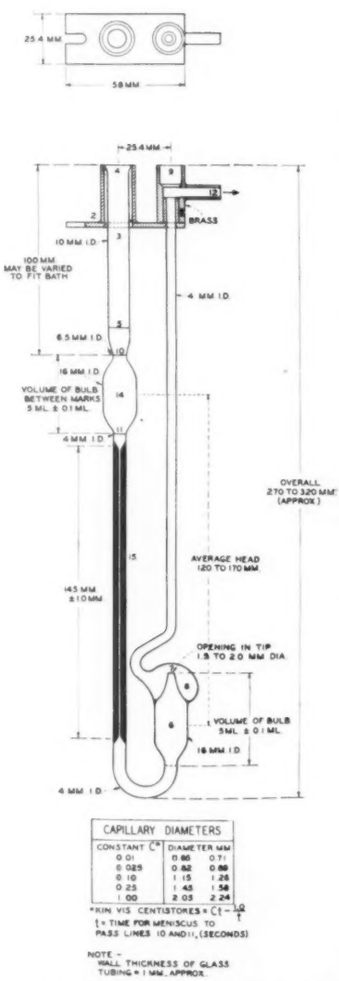

25.4 MM
58 MM
25.4 MM
BRASS
10 MM I.D.
100 MM. MAY BE VARIED TO FIT BATH
4 MM I.D.
6.5 MM I.D.
16 MM I.D.
VOLUME OF BULB BETWEEN MARKS 5 ML. ± 0.1 ML.
4 MM I.D.
OVERALL 270 TO 320 MM. (APPROX.)
AVERAGE HEAD 120 TO 170 MM
145 MM ± 10 MM
OPENING IN TIP 1.5 TO 2.0 MM DIA.
VOLUME OF BULB 5 ML. ± 0.1 ML.
16 MM I.D.
4 MM I.D.
CAPILLARY DIAMETERS
CONSTANT C*
DIAMETER MM
0.01 0.85 0.71
0.025 0.82 0.69
0.10 1.15 1.26
0.25 1.45 1.58
1.00 2.03 2.24
*KIN. VIS. CENTISTOKES = Ct − 0.0 / t
t = TIME FOR MENISCUS TO PASS LINES 10 AND 11, (SECONDS)
NOTE - WALL THICKNESS OF GLASS TUBING = 1 MM. APPROX.

Fig. 1. The newly designed viscometer has the trap at the lower end rather than at the upper end

Fig. 2. The general appearance of the new viscometer is shown by this photograph

ACCURACY and cost of viscosity measurements are important items in the modern refinery control laboratory. The problem of accuracy has been largely solved through the use of kinematic viscometers of the long, glass capillary type developed for this purpose in the past few years [1] [2] [3] [4]. The cost item depends principally upon the speed and ease with which the viscometers may be operated. Reduction in cost due to faster operation is particularly important in the larger laboratories, in which hundreds of measurements are made daily. Simplicity or ease of operation reduces cost by permitting the employment of unskilled operators. The development of a viscometer having the simplest possible operating characteristics without sacrifice in accuracy has therefore been desirable. With this purpose in view the viscometer shown in Figures 1 and 2 has been developed.

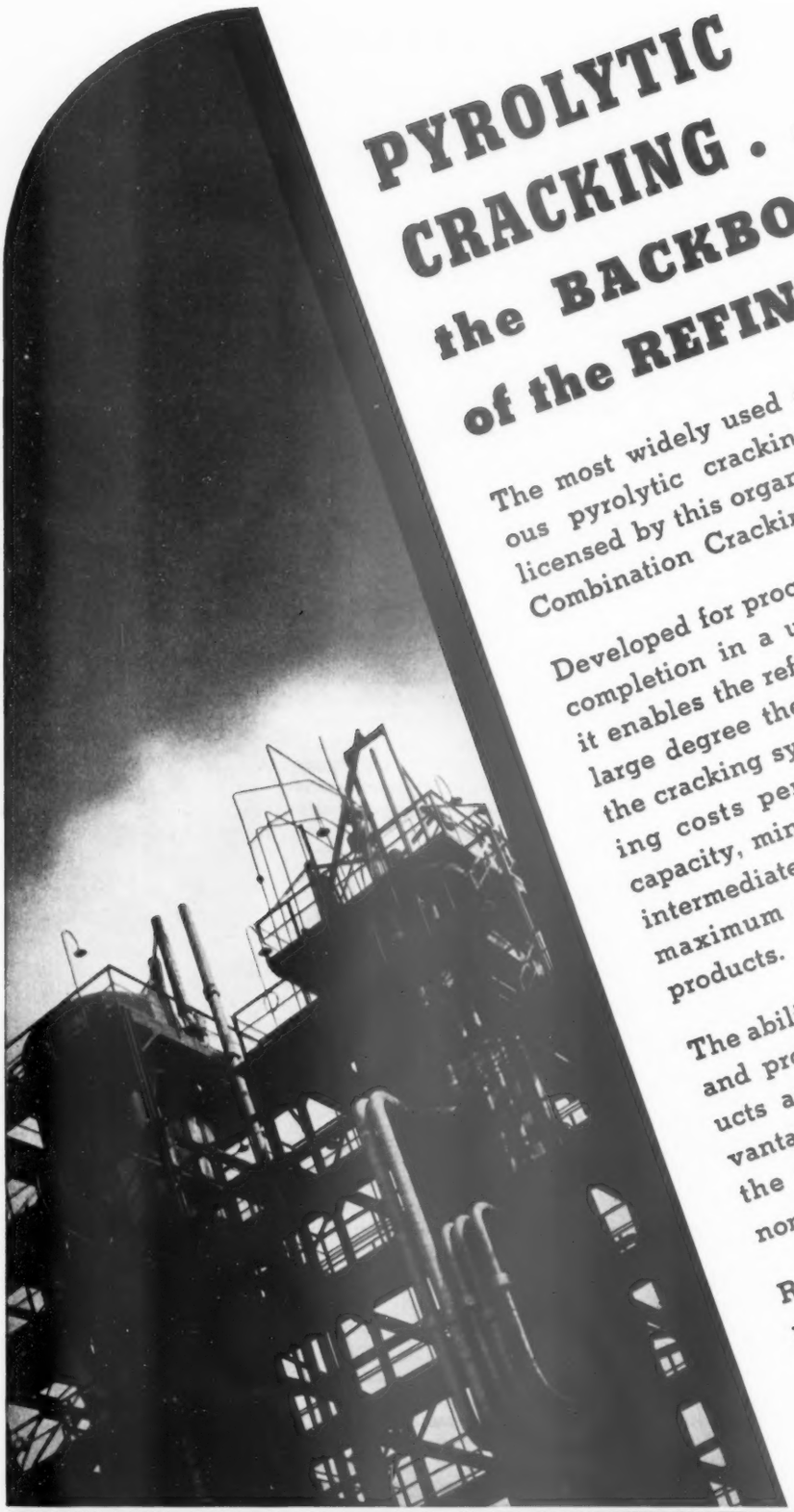
The essential difference between the viscometer illustrated in Figures 1 and 2 and the viscometer previously described by the author [1] [2] is in the location of the overflow trap 8. Placement of the trap at the lower end of the viscometer rather than the upper end has resulted in simplifying and speeding up the loading and cleaning of the instrument. The change also has simplified manufacture of duplicate viscometers with identical constants.

Important features of the viscometer that should be emphasized are as follows:

1. The method of establishing the working volume of the oil is automatic and accurate.
2. The viscometer is exceptionally easy to clean and dry. This is due to the relatively small surfaces to be cleaned.
3. The design offers a means for eliminating all uncertainty in the accuracy of measurement due to the difference in the surface tension of various liquids. This is accomplished by proportioning the parts so that the liquid in the two sides of the viscometer flows in sections of equal diameter. Small bore viscometers,

(1) Zeitfuchs, E. H., A.P.I. Proceedings, Mid-Year Meeting, 1939, Section III, Page 104. National Petroleum News, June 14, 1939, p. R-262.
(2) Zeitfuchs, E. H., National Petroleum News, Feb. 17, 1937, p. 68.
(3) Cannon, M. R., and Fenske, M. R., Industrial Engineering Chemistry, Analytical Edition, June 15, 1938, p. 297.
(4) Ubbelohde, L., Ibid., Feb. 15, 1937, p. 85.

*Standard Oil Co. of California.



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therefore, may be calibrated or standardized directly with water and these may be used as "master viscometers" for standardizing more viscous oils for use in calibrating the larger bore viscometers.

4. Air bubbles cannot be trapped in the liquid during loading or in the subsequent operation regardless of the viscosity of the liquid.
5. The design offers a practical and simple means for constructing viscometers with identical constants. The use of identical viscometers is important, particularly in routine testing.
6. The viscometer is assembled in a rigid metal support which may be clamped to a leveled surface above the viscometer bath. This insures perfect alignment and the rigid support adds strength to the viscometer.

Operation of the Viscometer

The viscometer, Fig. 1, is immersed in a constant temperature bath to approximately Line 5 and is supported on a level surface above the bath by means of the brass member 2. The sample is introduced at the funnel shaped opening 4 and allowed to flow down the wall of tube 3 until bulb 14 is filled and the meniscus stands at approximately Line 5. The capillary 15 prevents any appreciable amount of oil from entering the lower portion of the viscometer during this operation. The oil flows slowly through the capillary, under its own head, until it fills the lower bulb 6. Excess oil overflows through tip 7 into trap 8 and the working volume is automatically established between the end of tip 7 and the meniscus in the capillary. The position of the meniscus in the capillary varies slightly depending upon the surface tension of the liquid. The possible error in average head from this source has been calculated and found to be negligibly small in all cases. The oil is now returned to a point slightly above line 10 on the upper bulb by means of air pressure from a syringe bulb applied at 9 and the efflux time for the meniscus to fall from line 10 to line 11 is then measured. The viscosity corresponding to the efflux time is calculated by means of the appropriate equation or read from a table. To clean and dry the viscometer the opening at 9 is closed with a finger or cork and a volatile solvent is introduced at 4 and removed by suction applied at 12.

The efflux times and capillary diameters of a series of viscometers covering the range of viscosity of greatest interest in refinery practice, 1.0 centistoke to 1000 centistokes, is shown in Table 1. The range of efflux time for each viscometer has been limited arbitrarily between 100 sec. and 1000 sec. At the lower limit of 100 sec. an uncertainty in timing of 0.1 sec. will result in an error of 0.1% in the viscosity measurement. The upper limit of 1000 sec. has been set to restrict the time for measurement as much as is practical. It should be clear that the viscometer may be made to cover a desired viscosity range other than that shown in Table 1, by selection of the proper capillary bore.

TABLE 1—Viscosity Range of Viscometers

Viscometer Constant C*	0.01	0.025	0.10	0.25	1.0
Efflux Time, Seconds	100 to 1000				
Range of Viscosity (Approx.):					
Kinematic Viscosity, Centistokes	1-10	2.5-25	10-100	25-250	100-1000
Saybolt Universal, Seconds	32-60	35-120	60-450	120-1200	450-4500
Capillary Diameters, mm. (Limits)	0.65-0.71	0.82-0.89	1.15-1.26	1.45-1.58	2.05-2.24

C* Defined by equation,

$$\text{Kinematic viscosity (centistokes)} = Ct - \frac{1.0}{t}$$

t = Flow time, Sec.

Calibration of the Viscometers

The viscometers are calibrated by means of liquids of known kinematic viscosity by substitution in an equation of the following form:

$$K = Ct - \frac{B}{t}$$

where K = the kinematic viscosity in centistokes
C = the calibration constant of the viscometer
t = the efflux time in seconds
B = an experimental constant
$\frac{B}{t}$ = a correction term the value of which is very small compared to the Ct term as shown in Table 2.

The average value of B for the viscometers with capillary diameters 0.65 mm. to 2.24 mm. included in Table 1 was determined experimentally to be 1.0. The method used in these tests was similar to that outlined by Barr [5] and the American Society for Testing Materi-

(5) Guy Barr, A Monograph of Viscometry, Page 127.

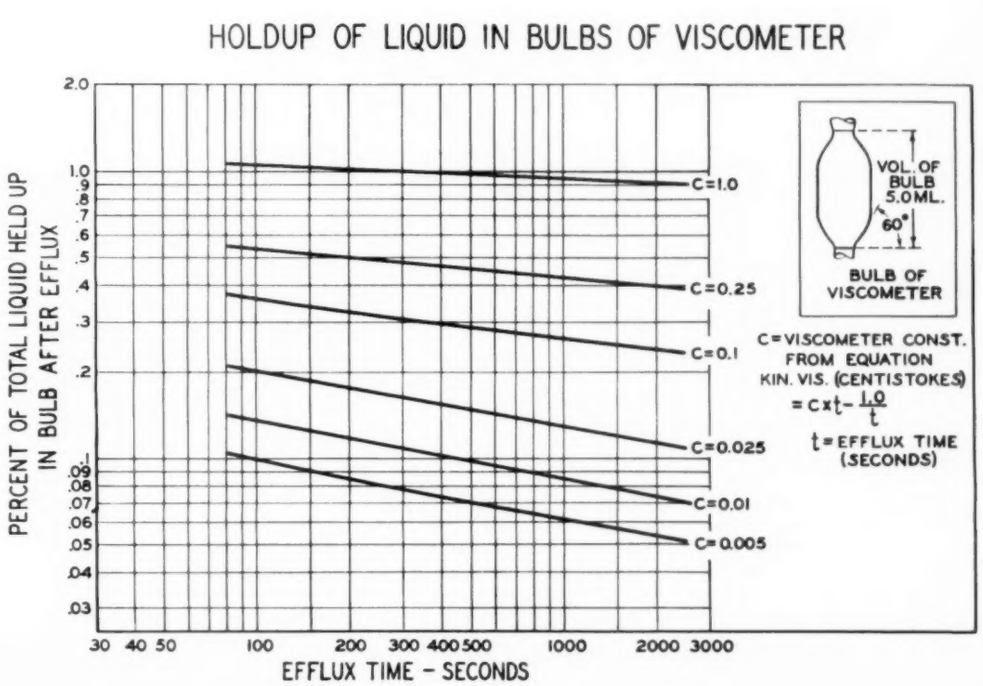

Fig. 3. The quantity of liquid adhering to the walls of the bulbs varies with efflux time

als [6]. Standardized oils were used and the tests were made at a temperature of 100° F.

The significance of the terms in equation (1) is shown by their relationship to the terms in the Poiseuille equation

$$K = \frac{u}{d} = \frac{\pi g h R^4 t}{8VL} - \frac{mV}{8\pi Lt} \quad \ldots\ldots (2)$$

$$C = \frac{\pi g h R^4}{8VL} \quad \ldots\ldots (3)$$

$$B = \frac{mV}{8\pi L} \quad \ldots\ldots (4)$$

$K = \frac{u}{d}$ = kinematic viscosity, stokes.
u = absolute viscosity, poises.
h = average head of liquid, cm.
R = radius of capillary, cm.
t = efflux time, sec.
V = volume of efflux, in time t, milliliters.
L = length of capillary, cm.
m = a constant.
g = the gravitational constant, cm. per sec. per sec.
d = density of the liquid at the temperature of measurement.

To simplify the conversion of efflux time into viscosity, the viscometers are constructed with identical values of the constant C and B. The most suitable values of C are even fractions of unity as shown in Table 1. The viscometers are standardized to conform to the desired value of C by adjusting the average head within the tolerances shown in Figure 1, during construction.

Equation (4) shows that the value of B depends upon the efflux volume, V, and the length of the capillary, L. To simplify construction it is desirable to allow a certain amount of tolerance in the volume and length. By means of equation (4) it may be shown that the tolerance of ± 1.0 mm. in the length of the capillary and ± 0.1 ml. in the volume of the upper bulb will cause a maximum variation in the value of B of 5.0%. As shown in Table 2 variation of 5.0% in the value of B will introduce a maximum error in the viscosity of only 0.05%. This occurs in the case of fastest flow in the smallest bore viscometer.

TABLE 2—Values of the $\frac{B}{t}$ Correction Term

Viscometer Constant	0.01	0.025	0.10	0.25	1.0
Efflux Time, Sec.			100		
Value of the First Term, Ct, of Equation (1)	1.0000	2.5000	10.000	25.000	100.00
Value of the Second Term, $\frac{B}{t}$ of Equation (1)			0.01		
Kinematic Viscosity, Centistokes	0.9900	2.4900	9.9900	24.990	99.99
Correction by $\frac{B}{t}$ Term for 100 sec. Efflux Time, Per cent.	1.01	0.40	0.10	0.04	0.01
Per cent Error in Viscosity by Allowing 5.0% Tolerance in Value of B	0.05	0.02	0.005		

Drainage

It is shown below that under normal operating conditions of the viscometer no appreciable error is introduced by failure of the liquid to drain completely from the walls of bulbs 6 and 14.

The quantity of liquid adhering to the walls of bulb 14 and 6, when these are emptied during normal test conditions, varies with the efflux time as shown by the curves in Fig. 3. The method by which these curves were established was described in a previous publication (1). It is not the total hold-up of liquid but rather the difference in the hold-up that is of importance. In normal operation the lower bulb 6 is emptied by pressure in about 40 seconds regardless of the viscosity of the liquid. The resulting difference in the amount of oil hold-up on the walls of bulb 6 due to the difference in the viscosity of the liquids causes a corresponding variation in the average head of the liquid. Calculations based on the data taken from Fig. 3 together with the assumption that the liquid drains uniformly as the lower bulb fills shows that the maximum variation in the average head for filling time of bulb 6 of 100 to 1000 sec. is approximately 0.1%. As shown in Fig. 3 for viscometer with constant 1.0 the maximum difference in the hold-up in upper bulb 14, corresponding to 100 sec. and 1000 sec. efflux time is approximately 0.1%. This difference in the hold-up in the upper bulb 14 lengthens the efflux time as the total time becomes greater whereas the increase in average head due to difference in hold-up in the lower bulb 6 shortens the efflux time. Since the effects on the efflux time, by these two factors, are approximately equal in magnitude in the case of any given viscometer and are opposed to each other it is safe to say that no appreciable error is introduced into the viscosity measurements from drainage.

The author wishes to express his appreciation for the technical assistance of Mr. R. Matteson and Mr. W. R. Doty of the Research and Development Department of the Standard Oil Co. of Calif.

(6) A.S.T.M. Standards on Petroleum Products and Lubricants, September 1940, Method D-445-39T, Page 274.

Set Safe Limits for Toxic Gases

Recent approval of four new standards defining the amount of carbon monoxide, hydrogen sulfide, carbon disulfide, and benzene which may be permitted in the air of work places without harm to workers by the American Standards Association is considered "a milestone in progress toward protection of workers" by Paul A. Neal, chief, Research Section, Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.*

The new standard provides that the maximal allowable concentration of carbon monoxide shall be 100 parts per 1,000,000 parts of air by volume with atmospheric oxygen not below 19% by volume adjusted to 25° C. and 760 mm. pressure for exposures not exceeding 8 hours daily, and 400 parts per 1,000,000 parts of air by volume for exposure not exceeding a total of one hour daily.

The new standard for hydrogen sulfide provides that the maximal allowable concentration shall be 20 parts per 1,000,000 parts of air for exposures not exceeding 8 hours daily, corresponding to 0.028 mg. per liter.

Benzene (benzol) should not be confused with benzine, a mixture mainly of aliphatic hydrocarbons, it is pointed out. The new standard provides that the maximal allowable concentration of benzene shall be 100 parts per 1,000,000 parts of air for exposures not exceeding 8 hours daily.

*Industrial Standardization, February, 1941.

$110,000,000 Market

The petroleum refining industry spent $111,535,000 for plant and equipment in 1939, it has just been disclosed by the Bureau of the Census in the first report of this nature ever released by the bureau. This figure represents establishments which accounted for 98.4% of the value of products manufactured by the industry.

Three-fourths of the total, $85,189,000, went for new construction and one-fifth, or $23,257,000, was spent for new machinery. Most of the remaining $2,773,700 went for used plant and equipment, and land, the report states.

1941 Standards

A new list of American standards for 1941 has just been announced by the American Standards Association. More than 400 standards are listed, covering definitions, technical terms, specifications for metals and other materials, methods of test for finished product, dimensions, safety provisions for use of machinery, and methods of work. The list of standards is obtainable without cost from the association, 29 W. 39th St., New York.

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Synthetic Rubbers Rely on Petroleum*

By I. E. Lightbown† and
J. A. Britton, Jr.†

ABSTRACT

All basic raw materials for making synthetic rubber are potential petroleum derivatives. Since our import of crude rubber on a weight basis is only 0.3% of crude oil produced, there need be no concern over a rubber shortage. The fundamental rubber hydrocarbon, isoprene, was discovered in 1860 but made no headway in synthetic rubber production. Butadiene, which is isoprene minus a methyl group, and dimethyl butadiene, which is isoprene plus a methyl group, were used to make Buna rubber about 1900. Polymerization of chloroprene (isoprene with a chlorine atom replacing the methyl group) produced Neoprene in 1926. "Buna S" and Perbunan then were produced by using the modifying agents, styrene and acrylo nitrile respectively, with butadiene. Standard Oil Co. chemists substituted various olefines for most of the trouble-producing diolefines and produced butyl rubber. Thickol, the only synthetic not vulcanizable with sulfur, is a condensation product of chlorine-containing organic compounds and sodium polysulfide.—Editor.

I. Natural Rubber

Certain tropical and semi-tropical trees and shrubs yield a white liquid of milk-like appearance which we have consequently called latex. By working rapidly an experienced tree tapper can collect almost 25 pounds of rubber per day. After collection, the latex, which is a colloid suspension of a hydrocarbon in water, is coagulated, thoroughly washed, sometimes smoked, baled and shipped.

For the last 5 years, rubber has been the item of greatest value imported by the United States, our annual rubber bill averaging more than $150,000,000.** We use about 600,000 tons per year, or about one-half the world consumption. United States manufactured goods of finished rubber are valued at over $1,000,000,000 annually.

Although the substance rubber had been recognized since the time of Columbus and had been used to make waterproof garments and the like during the early days of the 19th Century, it was not until 1839 that the true value of rubber was dimly seen. For in that year the Yankee inventor, Charles Goodyear, had made a remarkable discovery. He had found that by heating mixtures of rubber and sulfur he could produce a new and remarkable material. This process he called "vulcanization."

From 1839 till the turn of the century progress was slow. New machinery had to be devised, new markets discovered, new processes worked out. But the progress though slow was inevitable. And, with the coming of the automobile, with its pneumatic tires, rubber became one of the world's important structural materials. To illustrate this progress, examples of the world rubber production over a 77-year period are as follows:

Year	Long Tons	Year	Long Tons
1860	1,500	1915	155,000
1875	9,000	1920	295,000
1890	30,750	1925	525,000
1900	48,000	1930	825,000
1910	95,000	1935	873,000
		1937	1,135,000

The compounding of rubber for these divers uses has become a highly skilled art and is at present somewhat analogous to the alloying of iron with other metals to make anything from a pot stove to a battleship. A great many other ingredients besides rubber are used in this compounding art. For example, an automobile tire contains, as well as rubber, zinc oxide, sulfur, complicated organic materials such as mercaptobenzol-thiazol, whiting, stearic acid, pine tar, cotton or rayon fabric, and carbon black. The carbon black is made by burning natural gas and collecting the soot so obtained to impart good abrasion resistance to the tire, and this carbon black must be submicroscopic in size. Likewise, other rubber compounds are mixed with a long list of organic and inorganic materials which would take 20 pages to tabulate. It is, therefore, not alone the physical properties of the rubber itself, but the compounding art, which has made it a protean material.

Concurrent with this development the laboratory scientists were at work. As early as 1860, Williams, an Englishman, had discovered that the fundamental hydrocarbon unit, from which rubber is made, was a new organic compound which he called "isoprene." We know this material today as one of the simpler members of the diolefine family, that is, one of the members of the hydrocarbon family having two double bonds. The structure of isoprene is:

$$CH_2=\overset{\displaystyle CH_3}{\overset{|}{C}}-CH=CH_2.$$

For the next 40 or more years the work of chemists was directed toward what could most accurately be called "rubber synthesis." At first, the isoprene which Williams had identified was distilled from natural rubber, then it was induced to form rubber again. Since the rubbery material thus produced was of inferior quality and was moreover made from natural rubber itself at considerable cost and time, it could hardly be called commercially feasible, but should rather be classed along with such remarkable but uninteresting chemical processes as making lead out of gold. But in 1884, Sir William Tilden showed that isoprene could be first gotten from turpentine then polymerized into rubber. This was the first real synthetic rubber. To be precise, it was not, of course, a true rubber synthesis, for that operation would mean the exact duplication of all the chemical, physical and structural properties of the natural product, hidden and manifest. But no such rubber ever has been synthesized. And although "artificial" rubber would be a more accurate name, "synthetic" rubber is almost universally used; perhaps because the word artificial carries with it the suggestion of counterfeit rather than honest coin.

In about 1900, synthetic rubber investigation entered a new phase. Instead of working only with isoprene, different and more readily available diolefines were studied. Thus it was found that butadiene ($CH_2=CH-CH=CH_2$) which is isoprene minus a methyl group, and dimethyl butadiene ($CH_2-\overset{\displaystyle CH_3}{\overset{|}{C}}=\overset{\displaystyle CH_3}{\overset{|}{C}}-CH_2$) which is isoprene plus a methyl group could be made into fairly serviceable rubbers by heating them in the presence of sodium. Because butadiene and sodium were used the rubber so formed was called "Buna"—"Bu" from the former and "Na" from the latter (Natrium).

But even with these rubbers the desire had been to duplicate natural rubber as closely as possible. And it was not until the 1920's that it became apparent that a better

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* Slightly condensed from a paper presented at the annual meeting of the Western Petroleum Refiners Association at Hot Springs, Ark., April 16-18, under the title "Synthetic Rubber".

†Standard Oil Development Co., New York.

**U. S. Dept. of Commerce—"Rubber: History, Production and Manufacture."

method would be to duplicate nature's product in some respects but excel it in others. Thus it would be possible, for example, to make the new synthetic rubber last longer, or stand up against oil, or be carried to a higher temperature than natural rubber without melting. Thus, too, it would be possible to sell the new rubber for a higher price; for the far eastern plantations were learning newer ways of planting and grafting, so that the yields per acre of natural rubber were higher and the cost of producing lower.

Neoprene 15 Years Old

In 1926, the combined work of Nieuwland and Carothers gave us Duprene, since rechristened neoprene. This is made by polymerizing chloroprene ($CH_2=C-C=CH_2$, with Cl and H substituents) which is isoprene with a chlorine atom replacing the methyl group. Before the 1914-18 war the use of such a material for rubber manufacture would have been preposterous. Natural rubber contained no chlorine, so why should synthetic rubber!

At about the same time a not dissimilar type of work was going on in Germany. It had been found that the older method of polymerizing butadiene in the presence of sodium was unsatisfactory. A newer method was devised. It was discovered that when certain modifying agents were added to the butadiene, and a somewhat different method of polymerization was used, a new and greatly superior rubber resulted. The two modifying agents found to be most satisfactory were styrene ($CH_2=CH-$ benzene ring $-$vinyl benzene), and acrylo nitrile ($CH_2=CH-CN$ – vinyl cyanide). When the former is mixed with butadiene, emulsified in water along with the diolefine, and treated with a catalyst, a highly satisfactory rubber substitute results. This is called "Buna S." It is understood that it is this styrene-butadiene rubber that is being used for automobile tire treads in Germany today. If acrylo nitrile is used in place of styrene an even more satisfactory rubber called "Perbunan" can be made. For it is found that such a rubber, unlike natural rubber, does not swell to any marked degree when it comes in contact with oil. This makes it admirably suited to use in seals and gaskets, diaphragms, printer's rollers, gasoline hose and the like.

A few years ago all curb pump hose was made with a flexible metal lining. Between this metal lining and a tight outside cotton braid rubber was inserted. This natural rubber, although it swelled when gasoline came in contact with it, was prevented, by the inside metal lining and outside braid, from swelling excessively. A hose made in this way was serviceable but not always satisfactory. At that time, too, there was much talk about "oil-resistant" rubber. But this is a contradiction in terms. It is as impossible to make an oil-resistant rubber as it is to make a water-insoluble sugar. If you put enough sand in your sugar and stir a pound of this mixture into a quart of water you will have less sugar dissolved in water than if you had used the same amount of sand-free sugar. To make an "oil-resistant" natural rubber, the rubber compounder followed much the same procedure. That is to say, he mixed a great deal of fillers, such as whiting, clay, or carbon black, in with his rubber and by thus decreasing the amount of rubber per cubic inch of compound he consequently increased the oil-resistance.

With the commercialization of the truly oil-resistant synthetics such as Neoprene and Perbunan, the picture was greatly changed. Since these rubbers were not affected by oil it was now possible to leave the flexible metal lining out of curb pump hose construction entirely so that now almost all hose is the so-called smooth-bore variety where the synthetic rubber comes directly in contact with the fluid but is not swelled or disintegrated by it. Likewise, fuel-oil hose, distillate hose, deck and cargo hose, et cetera, are made from synthetic rubber, as are also the fuel and oil lines and the many rubber parts that go into aeroplanes.

Double Bonds Allow Oxidation

Besides its lack of oil resistance, natural rubber suffers other major shortcomings. We have seen that nature's product is made up of a great many isoprene units. We

It's a far cry from lamp fuel to rubber substitutes, but the amazing development in the manufacture of petroleum products has been made possible largely by progress in chemistry, and

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Swelling of Perbunan in Comparison With Rubber

Liquid in which sample is immersed	% Weight increase after 24-day immersion	
	Rubber	Perbunan
n-Heptane	105	No effect
Varsol	160	20
SAE 30 motor oil	35	No effect
White mineral oil (Nujol)	90	No effect
Benzene	225	214
Oleic acid	115	No effect
Amyl acetate	210	53
Cottonseed oil	41	No effect
Carbon tetrachloride	600	160
Diethyl ether	115	23
Acetone	No effect	97
Turpentine	330	25

have seen, too, that each of these units contains two double bonds (a diolefine). When isoprene, (or indeed any of the other monomers that go into making the synthetic rubbers so far looked at) is polymerized, it links up with itself, head to tail, like circuit elephants in a street parade, to form a very long straight polymer chain. One double bond of each monomer, therefore, is saturated by this linking-up process. But this leaves the other double bond still active in each of the fundamental units. A section of a rubber molecule, therefore, may look like this:

$$(-CH_2-\overset{CH_3}{\overset{|}{C}}=CH-CH_2-CH_2-\overset{CH_3}{\overset{|}{C}}=CH-CH_2-)\ x$$

It will be seen that there is one double bond for each C5 unit, or, if the polymer had butadiene as a starting material, one double bond for each C4 unit. The present theory is that the sulfur of vulcanization links the molecules of rubber together through the double bonds. But, for the very best vulcanized rubber, as little as 1 to 3% of sulfur is needed. What does this mean? It means that even in vulcanized rubber only a very few of the double bonds present in the molecule are saturated by sulfur. It follows then that a great many of the double bonds are still active, for it has been calculated that as little as 2% of the unsaturation is consumed during vulcanization. The remaining double bonds are still active. They may be fairly readily oxidized; it is because of oxidation that the rubber bands that lie on your desk for a year become hard and brittle. Likewise, to oxidation may be attributed the failure of your two-year-old spare tire to stand up as well as a new tire, although both tires were equally good to start with. By the same token, the ozone formed in the corona around a high tension power cable or an ignition wire rapidly attacks and disintegrates the rubber insulation. Similarly, acids and strong chemicals readily corrode rubber because there are so many double bonds where they may focus their action.

Double Bonds Found Unnecessary

A few years ago some of the chemists of the Esso Laboratories began thinking about synthetic rubber from a highly unorthodox point of view. They reasoned that, since only 2% of the unsaturation of natural rubber was used up in the vulcanization process, perhaps only 2% of unsaturation was necessary, the additional double bonds acting only as a kind of undesirable excess baggage. When it is realized that for many years chemists thought that the residual double bonds were responsible for rubber's elasticity it will be seen how radical was this reasoning.

Working along this line these chemists turned to the simple olefines rather than to the previously used diolefines as the fundamental raw material. Along with the olefine a small amount of diolefine was used, the latter only in sufficient quantity to give what was considered the minimum unsaturation to permit the necessary vulcanizability.

If the use of chloroprene as a synthetic rubber constituent had been preposterous to the pre-World War I chemist, such an approach as this would have been inconceivable. But call it what you will, inconceivable or preposterous or whatever else, the fact is that it worked; a rubber was produced that had only about one one-hundredth the unsaturation of natural rubber and yet which vulcanized. Such a rubber, after vulcanization, is substantially saturated. It possesses no double bonds to be oxidized, ozonized, or attacked by acids; it has the chemical stability of a paraffin hydrocarbon.

This type of rubber is now known as butyl rubber. The designation "butyl rubber" must be considered a generic term, for by varying the type of olefine or diolefine, it is possible to obtain rubbers that differ considerably in their detailed properties, even though they are the same insofar as their limited unsaturation is concerned. It is not permissible to discuss the polymerization technique at this time, but anyone familiar with hydrocarbon chemistry will realize the economic advantage of utilizing largely a simple olefine, rather than a diolefine, as the raw material for this new synthetic rubber.

III. Classification of Synthetic Rubbers

If ability to vulcanize with sulfur is taken as a criterion for a true rubber-like material, the known products may be classified as representing four basic types from the standpoint of the nature of the polymer chain, and also from the standpoint of the characteristic physical and chemical properties—viz.:

	Starting Point	Product
1.	Diolefine	Natural rubber (isoprene)
		Buna (butadiene)
		Methyl rubber (dimethylbutadiene)
		Russian products—SKA, SKB (butadiene)
2.	Chloroprene (possibly also with modifiers)	Neoprene
		Covprene
3.	Diolefines plus modifiers	Buna S (butadiene plus styrene)
		Perbunan or Buna N (butadiene plus acrylo nitrile)
		It has been announced that some of the more recent rubbers such as Hycar and Chemigum are butadiene rubbers with modifiers, so it may be assumed that they fit into this classification
4.	Olefines plus diolefines	Butyl rubber

Thiokol is probably the only product usually classified as a synthetic rubber that does not fit into this classification. As a condensation product of chlorine-containing organic compounds and sodium polysulfide, it does not—like the diene polymers—undergo curing with sulfur.

IV. Emergency Situation

Our present annual consumption of crude rubber is about 600,000 long tons. In 1940 it was 777,740 tons, highest in history. Of this, more than 97% comes from the Far East, some 10,000 miles away. It cannot be stated authoritatively exactly how much rubber we have on hand, how much is afloat, and what are the quantities of manufactured goods in our warehouses. But it may be assumed that there is a substantial quantity in all these categories.

Under normal conditions, with the synthetic rubber industry selling its products on a quality basis, expectations would be that the synthetics would occupy only a small percentage of the total rubber consumption until an ever increasing volume permitted a steady decrease in price, and the time when both output and price were in the neighborhood of those figures for rubber.

Should the supply of crude rubber be shut off, the synthetic industry would face an entirely different situation. Instead of being a specialty product, as at present, synthetic rubber would then have to replace or supplement our natural rubber supply. In answer to the question: why don't we grow our own rubber trees, the answer is that all such attempts have met with failure in North America. And in South America, where the climate is suitable, it would take at least seven years for the Hevea to reach its bearing period even under the most favorable circumstances.

To replace all our present import volume of natural rubber with synthetic would be no overnight job. If our rubber supply were cut off tomorrow there is little doubt but that our present consumption of natural rubber would have to be strongly curtailed in order to extend into the total synthetic rubber phase. This could be done in several ways.

It is of course true that the various synthetic rubber processes would require a correspondingly adequate supply of raw materials or chemical intermediates. This situation, however, can be fully met by expansion of known processes. It so happens that all of the basic materials involved —even in those cases where they are not being presently derived from this source—are potential petroleum derivatives. For this reason, it is of interest to note that, on a weight basis, our annual import of crude rubber is only about one-third of one per cent of the crude oil produced. Clearly then there need be no concern over the question of raw material for supplying any reasonable demand for rubber via the synthetic route.